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ABSTRACT

This manual is designed to help instructors implement a caregivers' course covering the use of technological adaptations to increase independence of individuals with severe disabilities. The course includes 12 sections in 8 hours of instruction. Notes on implementation and content of each section are provided, as are sheets for overhead projection, worksheets, and handouts. The sections include: an introduction to the course; a videotape describing relevant technology; a lecture on values and philosophy behind assistive technology; a group activity on assessment of individual needs; a small-group activity on seating and positioning; a discussion of mobility; a halftime summary; introduction to the second half; a lecture, demonstration and small-group activity on environmental controls; a videotape, demonstration, and discussion of adaptive devices; a lecture/demonstration of computer use techniques; and a course summary. A glossary and list of 14 references are included. (PB)

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Technological Adaptations to Increase Independence

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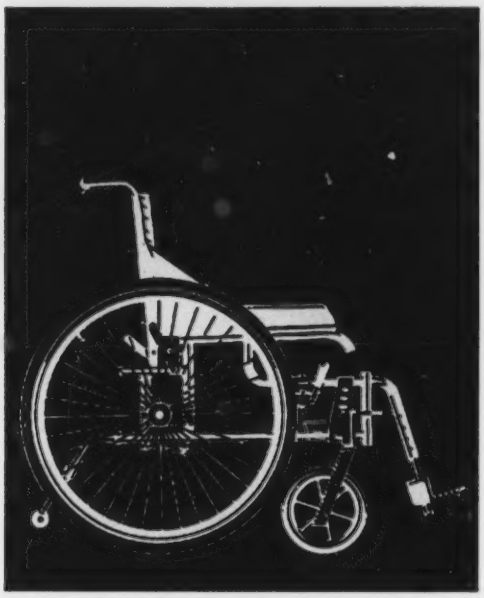
Technological Adaptations to Increase Independence



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Technology

Table of Contents

NOTES ON USING THIS MANUAL		1
COURSE OUTLINE		5
COURSE GOALS AND OBJECTIVES		9
SESSION 1	NOTES AND CONTENT	**11**
SECTION A:	Introduction	13
SECTION B:	Technology Video	15
SECTION C:	Values and Philosophy	17
SECTION D:	Assessment of Individual Needs	29
SECTION E:	Seating and Positioning	37
SECTION F:	Mobility	43
SECTION G:	Summary and Closing	49
SESSION 2	NOTES AND CONTENT	**51**
SECTION A:	Introduction	53
SECTION B:	Environmental Controls	57
SECTION C:	Adaptive Devices Video	65
SECTION D:	Adaptive Devices	67
SECTION E:	Computer Use	73
SECTION F:	Course Summary	79
OVERHEADS		**81**
WORKSHEETS AND HANDOUTS		**129**
GLOSSARY		155
REFERENCES		167

Technology

Notes On Using This Manual

The content upon which this course is based is found in the inside column of each page. Instructor's notes and guidelines appear in the outside column. These notes are intended to help less-experienced instructors create an interesting and effective classroom experience. More experienced instructors may feel free to add their own ideas. Overheads and handouts are provided to help reinforce key points.

This course is designed to be delivered in two four-hour sessions, but can be combined into one eight-hour session.

Notes To Instructor

This course has been specifically developed to help people responsible for providing direct care to individuals with severe disabilities understand and participate in the use of technological adaptations to increase independence.

This course is organized into a total of 12 sections. Overheads and several videos which can be used to augment the lecture or to demonstrate a particular technique are incorporated into the course.

The time recommended for each section is provided in the notes that preface the sections.

References employed in the development of this course are listed in the bibliography. Before teaching this course, we recommend that you become familiar with all of this material, review all videos and tapes plus the handbooks which go with some of the videos.

Format

This course is designed to be delivered via a combination of lecture, slide or videotape presentations, large and small group discussions, and role playing.

As you study the various classroom sections, you will notice that the role playing segments call for participation by at least three individuals. If your class size is too small to permit that level of participation and still generate adequate discussion, you may have to modify your delivery.

In some cases, existing videotape presentations may be substituted. You may wish to develop your own videotape using a home video camera with friends and associates serving as your cast.

Time

This course is designed for a total of eight hours of classroom instruction divided into two four-hour sessions to be held on two different dates.

You may find that your specific circumstances demand delivery over a different time frame. The course may easily be combined into one-day long session with a lunch break.

Additionally, while this course has been developed for stand-alone delivery, it may be combined with additional material as part of a more comprehensive course in the support of individuals with disabilities.

Materials

Originals of all required visual aids, overheads, and handouts are included in this manual. In order to deliver this material as designed, you will have to make overhead copies of these originals and sufficient copies of all handout materials for your class. In addition, the following equipment is required:

1. Overhead projector.
2. Projection screen.
3. VHS format video cassette recorder (VCR) or video playback unit.
4. Markerboard or flip chart pad with easel.
5. Two or three colored markers.

Technology

Course Outline

SESSION 1

A. INTRODUCTION
Lecture, 5 minutes

B. TECHNOLOGY VIDEO
Videotape/discussion, 25 minutes

C. VALUES AND PHILOSOPHY
Lecture, 20 minutes

D. ASSESSMENT OF INDIVIDUAL NEEDS
Large-group activity, 45 minutes

E. SEATING AND POSITIONING
Lecture/small-group activity, 85 minutes

F. MOBILITY
Lecture/discussion, 55 minutes

G. SUMMARY AND CLOSING
Lecture, 10 minutes

SESSION 2

A. INTRODUCTION TO SESSION 2
Lecture, 20 minutes

B. ENVIRONMENTAL CONTROLS
Lecture/demonstration/small-group activity, 75 minutes

C. ADAPTIVE DEVICES VIDEO
Videotape/discussion, 45 minutes

D. ADAPTIVE DEVICES
Lecture/demonstration/discussion, 55 minutes

E. COMPUTER USE
Lecture/demonstration, 65 minutes

F. COURSE SUMMARY
Lecture, 15 minutes

Technology

Course Goals & Objectives

UPON COMPLETION OF THIS COURSE, STUDENTS SHOULD BE ABLE TO:

1.0 Recognize the role technology plays in the lives of people with disabilities.

2.0 Identify the first person they should speak to when considering the use of technology for a person with a disability. They should be able to list three other considerations to make.

- 2.1 Gather information using the Basic Checklist for Assessment.
- 2.2 Assess barriers to independent mobility in the environment.
- 2.3 Request information from others.

3.0 Identify the three uses for positioning and seating.

- 3.1 Understand some of the effects of poor sitting posture.
- 3.2 Describe the uses for positioning.
- 3.3 Identify some of the seating components.

4.0 Identify the uses of two different types of wheelchairs and describe appropriate uses for each.

- 4.1 Demonstrate the differences between a standard manual wheelchair and a lightweight manual wheelchair.
- 4.2 Demonstrate the main components of a power wheelchair.
- 4.3 Describe the reasons for selecting various types of wheelchairs.

5.0 Describe and demonstrate the use of an environmental control system.

5.1 Define what environmental controls are.

5.2 Demonstrate the use of a single appliance environmental control.

5.3 Demonstrate the use of an environmental control system.

6.0 Describe the steps used to decide on adapting a device.

6.1 Conduct an assessment of commercially available equipment.

6.2 Identify possible modifications of commercial aids.

6.3 Describe adaptations of non-rehabilitation devices.

6.4 Request information from others.

7.0 Describe ways in which computers can be used to assist people with disabilities.

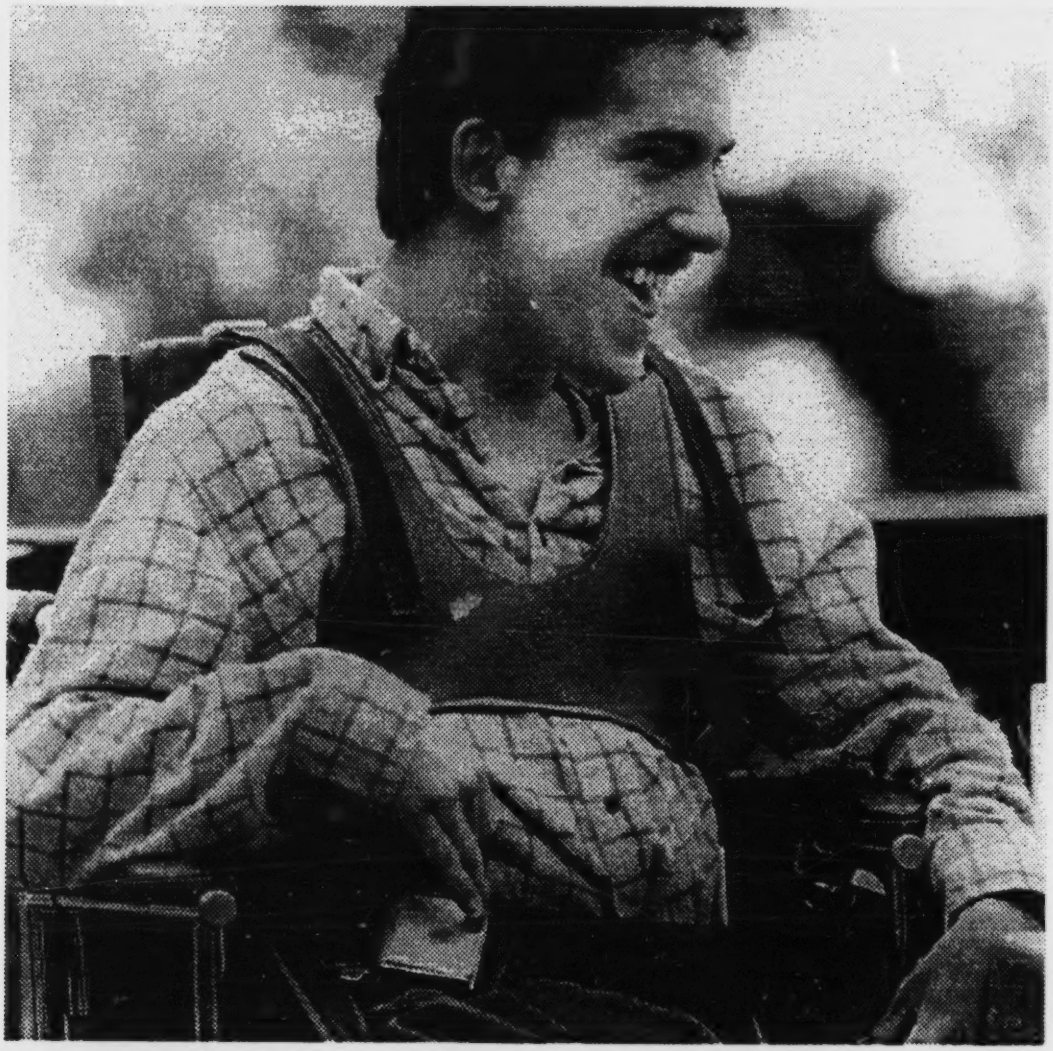
7.1 List the four major jobs a computer can perform.

7.2 Identify at least three assistive devices.

7.3 Describe at least two kinds of software.

Technology

Session 1. Notes and Content



Section A

Introduction

Format

Lecture

Time

5 minutes

Materials

Overhead 1

Notes

1. Introduce yourself and have the students introduce themselves.

2. Display Overhead 1, course goals. In clear terms that the students can easily understand, list the goals of the course.

Section A: Content

COURSE GOALS AND OBJECTIVES

Upon completion of this section, students should be able to:

1.0 Recognize the role technology plays in the lives of people with disabilities.

2.0 Identify the first person they should speak to when considering the use of technology for a person with a disability. They should be able to list three other considerations to make.

3.0 Identify the three uses for positioning and seating.

4.0 Identify the uses of two different types of wheelchairs and describe appropriate uses for each.

5.0 Describe and demonstrate the use of an environmental control system.

6.0 Describe the steps used to decide on adapting a device.

7.0 Describe ways in which computers can be used to assist people with disabilities.

Technology Video

Format

Videotape discussion

Time

25 minutes

Materials

"Technology: Tools for Life" Video
Videotape Player

Objectives

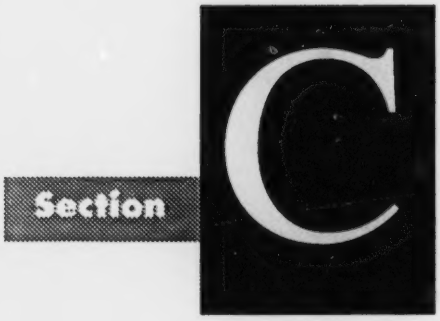
Upon completion of this section, students should be able to:

1.0 Recognize the role technology plays in the lives of people with disabilities.

Notes

1. Show the videotape "Technology: Tools for Life"

2. Lead a discussion of the videotape.



Values and Philosophy

Format

Lecture

Time

20 minutes

Materials

Overheads 2 – 5

Objectives

Upon completion of this section, students should be able to:

1.0 Recognize the role technology plays in the lives of people with disabilities.

Notes

1. Using the content included with this section and overheads 2, 3, 4, and 5, present the values and philosophy behind the practice of using technological adaptations.

Section B: Content

VALUES AND PHILOSOPHY

During the course of the last several years, technology has played a key role in changing the productivity, and functional speed of society. With the advent of the personal computer, the microchip, and various developments in the world of transportation we have witnessed the greatest change so far in our history.

Indeed, the entire business world, and the social world are very different. Today, with the luxury of automation, people have more free time on their hands to pursue more recreational activities, or fulfilling careers. People with disabilities are also beginning to reap the benefits of this technological revolution, but with greater difficulty than other segments of society.

Although collectively, people with disabilities are great in number, marketers of major companies, as well as their boards of directors approve technology research and development for appeal to the largest audience (the masses) as possible.

That does not mean that there are not companies that develop technology for people with disabilities, and it certainly does not mean that some major companies such as IBM, and Apple do not have specific divisions within their business for technology for people with disabilities. The problem remains that their efforts are not as concentrated as they could be either because they really do not fully understand their market or they do not have a budget as large as we would like to see for this type of development.

What you must realize is that there is so much technology for people with disabilities to tap into that was not necessarily developed for their specific use. The key is that we must look at everything from a new viewpoint and creatively think in an entirely different way than we may have been used to not only about technology, but about people with disabilities.

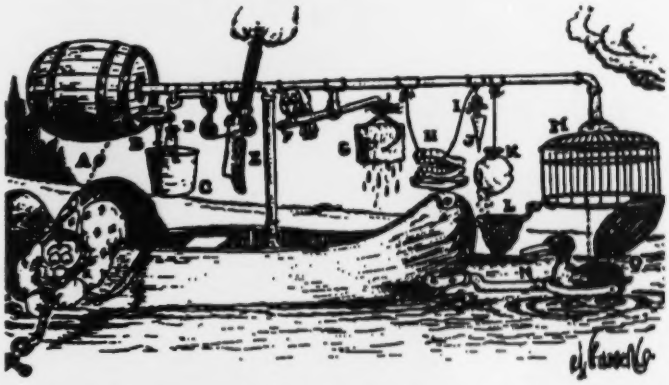
Let's stop for a minute and talk about values, and philosophy.

First of all, when we talk about the subjects of philosophy and values, we really are talking about the same things. The philosophy is that people with disabilities can do anything that anyone else can, with the only possible difference being approach. An individual, for example, who does not have the ability to use vocal cords still has the ability to speak. It may be through some piece of technology, or some other method of communication.

The value that would logically follow from this philosophy is that if people with disabilities can do anything that anyone else can then they are an extremely important part of society, and it is everyone's job to figure out how to advocate and pull together whatever is necessary in order for people with disabilities to be as independent as possible.

Technology is one enhancement tool; our values, our philosophy, and certainly our attitude are also the best tools we can use in making life better for everyone.

Values play a key role in the development of how we as professionals in the field work for people with disabilities in order to help achieve mutual goals. Just as we are a means for a person with a disability to attain specific and general goals so should this be the case for technology. Technology should be a means to an end. The end being what the person with a disability needs in order to attain a higher level of independence.



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So far we have been using this term technology. What does it really mean? Well we could give you the standard definition in the dictionary, and it would work, but let's take a look at the anthropological definition of technology.

Technology is the body of knowledge available to a civilization that is of use in fashioning implements, practicing manual arts and skills, and extracting or making materials.

So what does this really mean as it relates to people with disabilities? What should it mean to us as professionals in the field?

It means that all of us have a body of knowledge as it may relate to technology. It is important to mention that we are not speaking about the kinds of technology that scientists in huge laboratories invent, or complex computers, we are talking about a hammer, or a saw, or anything that may be used as a tool by us to help enhance the life of the person with a disability who wants to be more independent.

For example, we know of an individual who was in a terrible trucking accident. The individual was a truck driver, and after the accident lost both of his arms. His insurance coverage gave him enough money so that he did not have to drive a truck anymore, nor really work at all. Basically, he was happy with this arrangement because he really enjoyed playing with his son, going to the park and watching television. One other activity he really liked was drinking beer. This, however, proved to be one of his greatest problems. He wanted to drink a beer on his own.

The truck driver went to a research facility. The professionals listened to his needs and built the truck driver "robotic" arms. Using muscles on his torso and certain electronic commands, the driver was able to pick up the beer and almost drink it on his own. The problem was that the arms were very difficult to control, and sometimes the truck driver would hit himself in the face. Another problem was that each arm weighed over sixty

pounds and the arms were difficult to put on and take off. The truck driver also developed terrible sores under his arms.

The end result was that he gave up using them and had to go back to asking his wife, or son to help him drink the beer. Until he was able to meet with a "REHABILITATION TECHNOLOGIST" (this is a person with common sense as the most important tool to helping people with disabilities achieve their goals, and we will be talking about this role later). The rehabilitation technologist asked the driver what his needs were, and after some discussion, the rehabilitation technologist resolved the problem. The driver was given a long straw.

TECHNOLOGY IS NOTHING MORE THAN USING COMMON SENSE TO GET THE JOB DONE.

Another concept we should remember is that with more complex technology, like a computer, or a communication device, we don't have to really understand it in order to use it. A very simple example of this is an automobile. Most of us really do not understand how an engine works in relationship to the brakes, or how to make a spark plug spark. What we do know, however, is that if we turn the key and step on the gas, the car will go.

I'm sure that many of us have money access cards that we use at the bank or cash machines. By the same token, we really don't know how they really work. All we know is that we press a button with

our confidential code, and ask it for 25 or 50 dollars that it either gives us the money or tells us that we do not have it in our account. Now let's think about what this technology has done for us relative to banking, and relate similar examples to how we deal with people with disabilities.

First of all, we all remember what it was like to do banking before we had the use of a money access card. We could only go to the bank during limited hours, during our lunch hour, or we would have to get up early on Saturdays to make it to the bank. In other words, we used to have to plan to go to the bank. It became something we had to think about, and make an effort to get done. We could go only to the bank in order to get our money. Now money bank machines are near grocery stores, in bus/train stations, airports and shopping malls.

Let's take a look at this kind of example, and the similarity that this would have to people with disabilities. The example we should think about is communication devices. As with the bank, we did not have a "MOBILE" or accessible system. Now, just as banks are more accessible throughout the community because technology has made access more "portable," so are communication devices.

Back in the days when you had to bank during limited times, people who did not have the use of their vocal cords had to use other ways to communicate with people instead of speaking. The communication device was usually a large plastic board (about the same size as a monopoly board). The board had various pictures: maybe a

picture of a glass, a toilet, a chicken, a cow, a dog, or a banana.

The point is that you could not really fit very many pictures on this board, so communicating was very difficult. The person who had to use an alternate way of communicating would point to a picture using a pointer attached to the head (because the individual could not use their hand) or some other body part. With such a limited vocabulary of pictures, all the person could say is "I WANT A GLASS OF WATER" (by pointing to the glass), or "I WANT TO GO TO THE TOILET" (by pointing to the toilet), or maybe with the pictures of the farm animals do some version of "OLD MCDONALD'S FARM" or say a nonsense sentence, "THE CHICKEN WANTS A BANANA" (by pointing to the chicken and the banana).

When the bank machines were first developed, all you could do was take out money. Now you can pay bills, make deposits, transfer money, and even ask your balance. The result is that limited use became expanded.

The "OLD" type communication board frustrated the person with the disability. The question then becomes what effect did this have with staff, and with the person who had such a limited communication tool? Well, it meant that the person with the disability who wanted to express feelings like love or friendship couldn't do it. This also meant that the person who was used to speaking in a "CONVENTIONAL" fashion would almost avoid making conversation, because they could not talk to each other. It became a major effort just to speak to the other person, and just like going to

the bank on Saturday morning, you had to schedule it. You had to make a big effort to do it.

The other similarity these "MONOPOLY BOARDS" had with the bank was that you were very limited as to where you could use them. If you ever went with the person, anywhere outside his/her home that person could not speak to you.

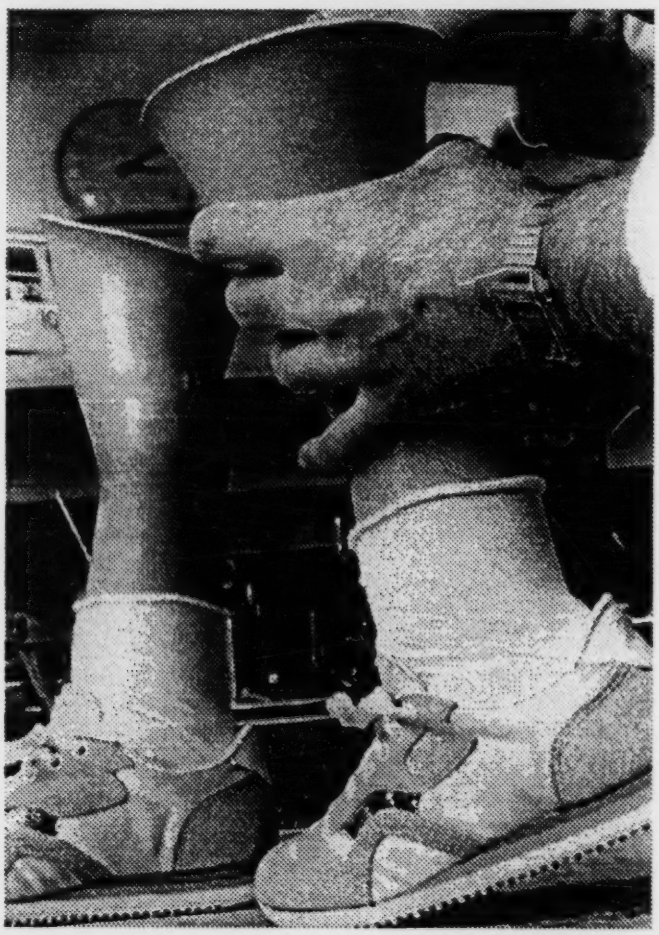
As a result, a person with a disability who could not speak in the "CONVENTIONAL" fashion ended up with the following:

- Limited contact with others
- Limited times when others could carry on conversations
- Being able to "CONVERSE" with another only by having that other person looking over their shoulder at the board
- Limits on the ideas that could be communicated
- Limited places where conversation could occur
- Being avoided because it was too much trouble to talk with the person with a disability

The good news is that through computers and advanced communication devices, people with disabilities can express many more ideas. The fact remains, people with disabilities have always had

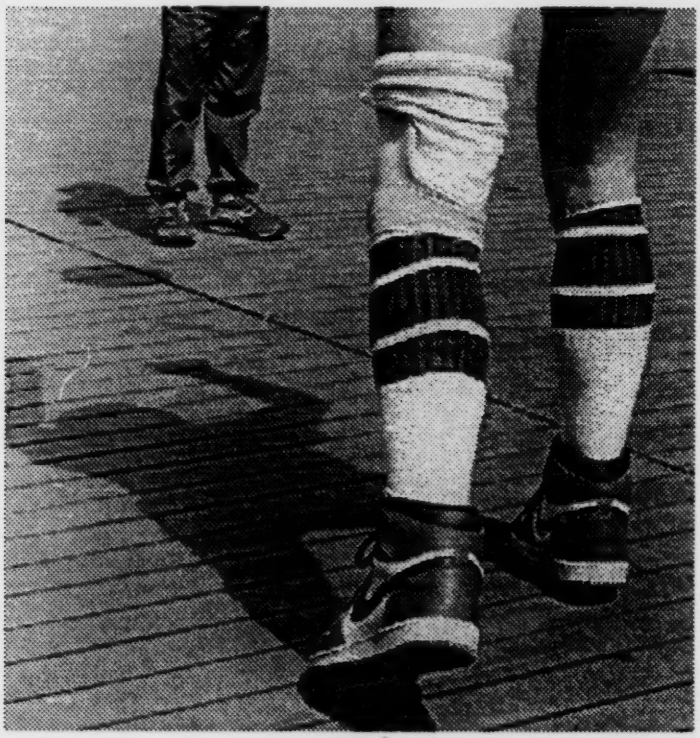
something to say, now they can say it faster, with less effort, and (because of the fact that most of these items are portable), anywhere they want.

The same applies to getting around with a power wheelchair, and controlling a person's environment with wireless switches. Some of these pieces of equipment, some of these controls, and various forms of technology must be purchased through sellers that specialize in that kind of equipment.



However, a lot of the items you will learn about can be purchased in a Radio Shack, or a small appliance store. You may even have some of the items in the house.

The point is, our job must be to think about how technology can increase independence for the people we work for (i.e., people who happen to have disabilities). We know that if people with physical disabilities are given the right tools they can do anything anyone else can do. It is our job to advocate for helping people with disabilities obtain these tools, and equally as important for us to think about what we can do to increase thinking, learning and having fun.



Flattop haircut for balancing fruit
Bow tie with folding trays
Drop-shelf patch pockets
Extension trays from pants pockets
Shirt studs with folding cups for salt and pepper
Special long-distance fork

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Section D

Assessment of Individual Needs

Format

Large-group activity

Time

45 minutes

Materials

Overheads 6 – 8

Worksheet 1: Basic Checklist for Assessment

Objectives

Upon completion of this section, students should be able to:

2.0 Identify the first person they should speak to when considering the use of technology for a person with a disability. They should be able to list three other considerations to make.

2.1 Gather information using the Basic Checklist for Assessment.

2.2 Assess barriers to independent mobility in the environment.

2.3 Request information from others.

Section C: Content

The goal of this chapter is to demonstrate the basic information necessary to assess how the application of technology can be used to meet the needs of a person with a disability.

IMPORTANT POINTS TO STRESS:

- We have discussed the philosophy, values and attitudes that are important in working with persons with disabilities. We have also talked about the definition of technology and how important it is in promoting independence.

- Now we are ready to actually do something with our attitude and our interest in technology. We begin with the individual, to identify what his/her needs are and to find ways to meet those needs.

- As people responsible to persons with disabilities, direct care staff play a major role in working with professionals relative to assessment. It is extremely important for direct care staff to communicate to the professional about the needs of the individual who is being assessed.

PURPOSE AND PROCESS OF MAKING AN ASSESSMENT

To be able to make informed decisions in the selection of adaptive equipment, the individual who will use the device must be able to demonstrate a need which is not currently met. For example: A person who is unable to talk has the need for some type of communication system. The first goal of assessment is to discover what an individual needs. To do so, follow this process:

A. ASK QUESTIONS.

Ask the person who is being assessed what he/she has trouble doing or what he/she are unable to do. This is always the first person to speak to. If however the person cannot speak to you, or the person has difficulties understanding what you mean, ask a person who is working with the individual with a disability. People may need us to patiently explain, in great detail, what we may consider basic ideas.

EXAMPLE:

Betty is Ted's case manager and she asks him if he has any difficulties operating devices around the house. Ted, who is a person with cerebral palsy and is unable to use his fingers, says he has trouble turning on and off lights.

B. OBSERVE.

See if a person is having difficulties doing a task.

EXAMPLE:

Doris uses a manual wheelchair. When she and her assistant Helen go food shopping, Doris gets very tired from wheeling through the store. Helen always has to wait for Doris to catch up with her to make decisions about the food to buy. Helen would like to push Doris, but can't push her at the same time as she pushes the grocery cart.

C. LOOK AT ABILITIES.

What are the person's strengths?

EXAMPLE 1:

Ted, who is unable to use his fingers, can use his feet very well. In fact he paints pictures by holding a paint brush between his toes.

EXAMPLE 2:

Doris can sit up easily and has full use of her hands and arms. She has a job at a factory assembling vacuum cleaners.

D. LOOK AT THE ENVIRONMENT.

Where do people need help?

Home, work, school or somewhere else?

Are there any size limitations for the equipment?

EXAMPLE:

Jenny is a 13-year-old girl who is independently mobile in a power wheelchair. She uses a computer to do her homework on at school. She cannot take the computer home because it is too big and has many wires to connect and they are always breaking.

E. ASK FOR INFORMATION FROM OTHERS.

Talk to: family members, personal assistants, teachers, therapists, friends, volunteers, others.

EXAMPLE 1:

Helen, Doris' morning assistant, said that another woman she worked with had a power wheelchair with a basket on the front. She could do a lot of the small shopping trips herself and never get tired.

EXAMPLE 2:

Jenny's father said he had seen a small, portable version of the computer Jenny uses in school and could easily hook it up so she could use it to do homework.

Remember, the user, the family, the staff and friends are vital to the assessment process. No one else knows the hopes, likes and dislikes, values, or needs of the person with disabilities. The direct care staff carry out the plan.

Seating and Positioning

Format

Lecture/small-group activity

Time

85 minutes

Materials

Overhead 9

Objectives

Upon completion of this section, students should be able to:

3.0 Identify the three uses for positioning and seating.

3.1 Understand some of the effects of poor sitting posture.

3.2 Describe the uses for positioning.

3.3 Identify some of the seating components.

Session D: Content

The goal of this section is to make the students aware of the importance of proper positioning of a person with a disability that assists the person to function independently.

Once an assessment or an evaluation of a person's needs has been made, you can go on to provide the devices you have identified.

For many people with disabilities, the first step must be proper positioning or seating. If they are in pain, extremely uncomfortable, or unable to see their surroundings there is not going to be much progress towards independence, learning, or paying attention to a given subject.

Let us begin by talking about the importance of proper seating for persons without disabilities. We are all familiar with baby seats and swings, high chairs and booster seats. These are all adapted seating systems to meet the needs of a special group; babies and children.

Notes

1. Using the content provided, introduce seating and positioning (5 minutes).

2. Demonstrate (using students) how sitting improperly can cause pressure sores. Ask them how it feels to be sitting in their chairs. (10 minutes with discussion)

3. Demonstrate the strain to the back by leaning to one side while seated. Again, ask for student responses about how it feels. (10 minutes with discussion)

Now think about your own life. We use beach chairs, dining room chairs, bar stools, couches and lazy-boys for leisure time activities. Then we have more chairs for special jobs or activities; barber chairs, dentist chairs, the little stool the person in the shoe store sits on. Ask any typist or computer operator about the importance of having a chair with proper support and height.

These are all adapted seating systems for special uses (ask class to give further examples). How then can we expect a person with a disability to buy a standard wheelchair and sit in it all day? We cannot.

Therefore each person must be evaluated and a system that meets individual needs must be purchased and/or adapted. Then, different attachments can be added for different jobs or activities the person does in a typical day. Examples of these are trays of adjustable tables for dining and working, attachment of joysticks for computer or communication devices, tie-downs for transportation.

4. Using overhead 9 define seating and positioning and its uses, giving examples of each. (10 minutes)

Seating and positioning refers to the customization of a person's wheelchair to conform to individual body contours. It also refers to the devices used to give stability to an individual in a seated position.

SEATING AND POSITIONING SYSTEMS CAN:

- Prevent skin sores in areas bearing the body's weight.
- Assist in holding a person upright to allow them to:

  COMMUNICATE
  BE INDEPENDENTLY MOBILE
  EAT
  WORK
  PLAY

- Help promote function and mobility.
- Prevent spinal conditions.

5. Role play utilizing a simple seating system with lateral trunk support, and seat bottom and back. Discuss with students the results of the role play. (30 minutes)

6. Divide the class into small groups of three to four students each. Have each group make a list of the different kinds of chairs people use in daily life. Pick five examples from the list and describe how an individual wheelchair could be adapted to meet that same special purpose. Determine whether the wheels on a chair are appropriate for a particular individual's size. Discuss why we use power chairs versus manual chairs. (20 minutes)

Mobility

Format

Lecture/discussion

Time

55 minutes
(80 minutes if a one-day class)

Materials

Overheads 10 – 12

Handout 1

Guidelines for Using Wheelchairs

Objectives

Upon completion of this section, students should be able to:

4.0 Identify the uses of two different types of wheelchairs and describe appropriate uses for each.

4.1 Demonstrate the differences between a standard manual wheelchair and a lightweight manual wheelchair.

4.2 Demonstrate the main components of a power wheelchair

4.3 Describe the reasons for selecting various types of wheelchairs.

Section E: Content

The goal of this section is to make the students aware of the many different types of mobility devices available to enhance the independent mobility of people with disabilities.

IMPORTANT POINTS TO STRESS:

- Mobility is, of course, a major factor in measuring a person's level of independence. In fact, mobility is so basic that for years this was the only area of technology developed for persons with disabilities.
- Today, despite all the devices available, a person must first be mobile.
- The first step is to assess an individual to determine the need for either a manual or a power chair.

Notes

1. Using the content provided, introduce the concept of mobility. (10 minutes)

2. Ask for one or more volunteers to describe the abilities, disabilities, and environment of a particular individual. Using this example, discuss how the assessment should proceed. (20 minutes)

3. Using the students' description of individuals they know, as well as the examples on overheads 10, 11, and 12, present the similarities and differences between manual and power wheelchairs and when each should be used.

Make the points presented in the content provided here.
(20 minutes)

For individuals who are not able to functionally walk, the selection of a wheelchair is a necessary part of daily living. There are many types of wheelchairs. They are divided into two groups.

MANUAL AND POWER.

Manual wheelchairs are either pushed by the individual user or by an attendant. They may be lightweight (less than 35 pounds) or standard (60 pounds or more). Some are designed to fold and some do not. Most individuals use some kind of seating system with their wheelchair.

Power wheelchairs are driven by motors powered by batteries. There are many different ways of controlling these chairs. A joystick is the most common way to control a power wheelchair. It can be used with a hand, chin or foot.

Manual and Power wheelchairs have similar functions but some are different. The following are some of the similarities/differences between the two chairs:

Similarities

MANUAL WHEELCHAIR	POWER WHEELCHAIR
Footplates Front caster wheels Frame Seat and Back	Footplates Front caster wheels Frame Seat and Back

THE DIFFERENCES BETWEEN WHEELCHAIRS MAKE THE SELECTION OF THE BEST CHAIR A CAREFUL PROCESS.

EXAMPLE 1:

Bob is a 22-year-old man who became paralyzed following a car accident. He is able to use his arms well and has an adapted car. His wheelchair needs to be light enough that he can lift it into his car.

EXAMPLE 2:

Carol has a hard time using her manual wheelchair in the factory where she works. It takes her a long time to go from one end of the building to the other. When she gets to work she transfers to a three wheeled power chair. She is able to move around the factory easily this way.

Differences

MANUAL WHEELCHAIR	POWER WHEELCHAIR
Hand rims 30 to 75 pounds Easier to transport No motor Requires more physical effort	Joystick 150 to 275 pounds Battery Motor Louder in sound

4. If this is a two-session class:

☛ Review the main points of Session 1.

☛ Assign the following homework: (5 minutes)

☛ Please write a summary description of an individual whom you work with who is mobility impaired.

Based on the information you have been provided, make recommendations for the type of wheelchair and some special accommodations that will increase his or her independence. At our next meeting we will review several of these summaries.

If this is not a two-session class:

Have students break into small groups of three or four and complete the assignment. (30 minutes)

Summary and Closing

Format

Lecture

Time

10 minutes

Materials

Student handouts for Session 1

Notes

1. Review the main points presented in this session.

2. Give students any handouts from this session including copies of all overheads.

Section F: Content

This section has been developed to bring the first half of the session to a close with a review of the material covered in the previous sections

Technology

Session 2. Notes and Content

Introduction to Session 2

Format

Lecture

Time

50 minutes if two half-day classes
20 minutes if one-day class

Materials

None

Notes

If this is a two-session class:

1. Review the main points from Session 1 (10 minutes)

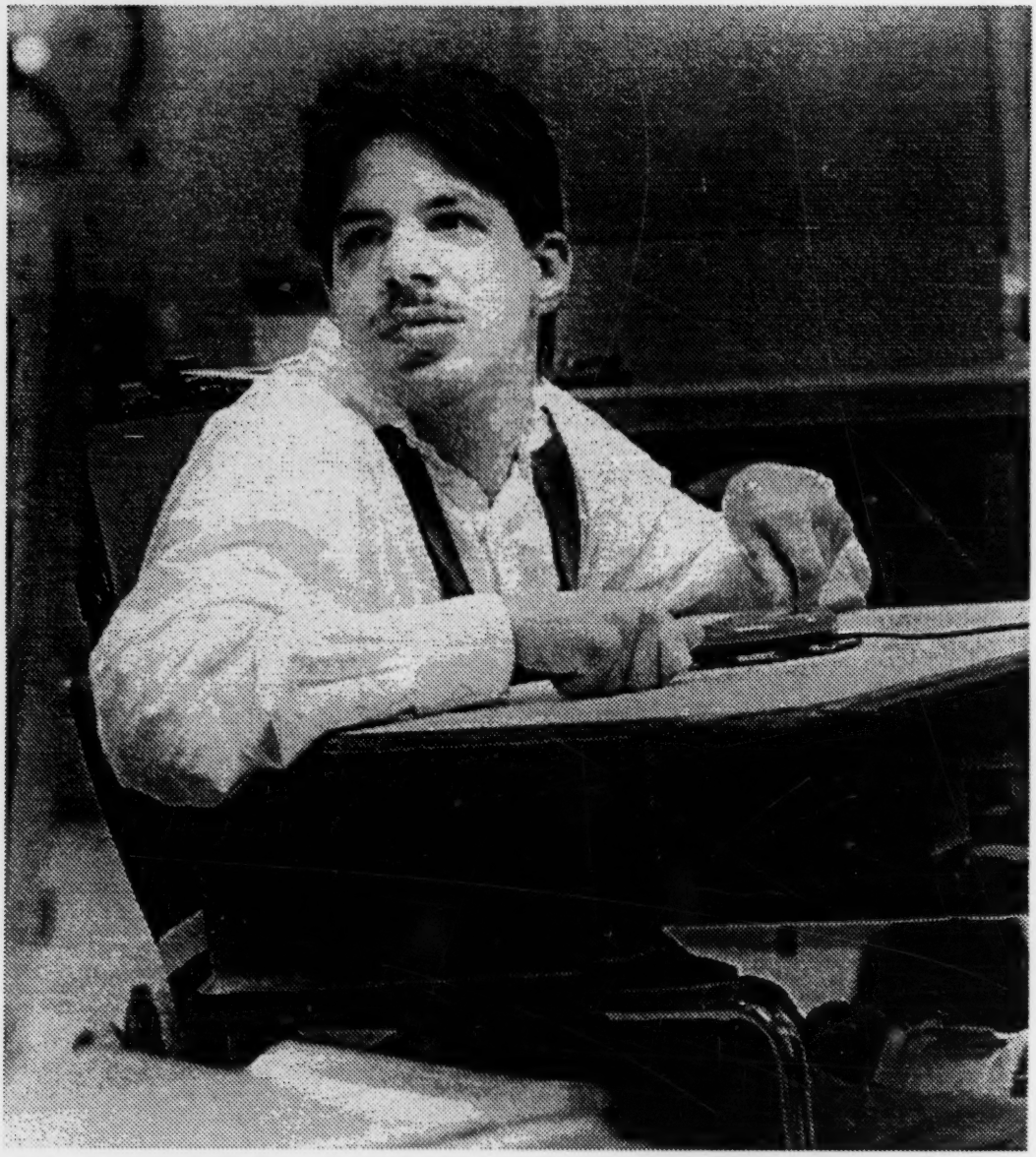
2. Have students break into small groups of three or four and compare their homework. (15 minutes)

3. Ask students to share their recommendations for wheelchair prescriptions. Comment on the recommendations as appropriate to reinforce the points you've made. (20 minutes)

4. Briefly explain what Session 2 will cover (5 minutes).

If this is a one-day class:

1. Ask students to share their recommendations for wheelchair prescriptions. Comment on the recommendations as appropriate to reinforce the points you've made (20 minutes).



58

Environmental Controls

Format

Lecture/demonstration/small-group activity

Time

75 minutes

Materials

Overheads 13, 14, 15 and 16

Handout 2

Equipment/devices to use in demonstrations

Objectives

Upon completion of this section, students should be able to:

5.0 Describe and demonstrate the use of an environmental control system.

5.1 Define what environmental controls are.

5.2 Demonstrate the use of a single appliance environmental control.

5.3 Demonstrate the use of an environmental control system.

Section B: Content

The goal of this section is to make the student aware of what environmental controls can do and the range of these devices available.

Environmental controls are devices that allow an individual to control lights and/or appliances within their environment. These devices can control individual or multiple appliances. An environmental control which can operate more than one device is called an environmental control system.

Once an individual is equipped with proper seating/positioning and mobility devices you can begin to work on the next step towards independence. This step involves giving the individual the power to control things in the environment. We do this all the time without thinking of it as technology. You certainly don't call the light switch in your bedroom an environmental control. Don't be discouraged by technical language that is often used when referring to people with disabilities. What we are talking about are things like light switches, radio and TV knobs, oven controls, and any other appliance that any person would use in their home or work space.

The difference for persons with disabilities is that most appliances are designed for the general public. It is therefore our job to make adaptations to enable persons with disabilities to use these useful and enjoyable devices just like everyone else.

Notes

1. Using the content provided and overheads 13–16, define environmental controls and their role in increasing people's independence (5 minutes).

ENVIRONMENTAL CONTROL SYSTEMS:

Allow people with physical disabilities, and who are non-speaking, to operate various electrical devices in their surroundings.

CONTROL 1: Prentke Romich Company

- Responds to computer commands issued from a variety of input devices
- Controls lamps, radio, television, electric bed, telephone, intercom, power drapery, page turner, call signal, etc.
- Modular components
- Compatible with IBM PC
- Cost varies according to components required

HOME AUTOMATION LINK:
The Voice Connection

- Voice activated control of telephone dialing, lights, appliances, television, radio, etc.
- Interfaces with personal computer via IntroVoice III circuit board
- Optional devices available
- Compatible with IBM PC and PC/XT
- Cost $500 plus IntroVoice III

MOD KEYBOARD SYSTEM:
National Research Council of Canada

- A family of plug-in cartridges designed for people with disabilities which require a variety of input interfaces and applications
- "Elementary" MOD Keyboard for children
- Morse code option
- Analog input version with a smoothly moving cursor
- Auto display feature
- Compatible with standard software
- Compatible with IBM PC
- User-definable word-phrase pages
- Contact vendor for price information

2. Demonstrate some examples of environmental controls (15 minutes).

Activity: Set up a single appliance environmental control device. This should be plugged into a device such as a lamp or radio. The system should be discussed, including its strengths and limitations.

For example:
Connect the Radio Shack, Wireless Sonic Remote Control Switch to a lamp that is already plugged in. Squeeze the hand-held "whistle" and the light will turn on. Squeeze it again and it will turn off.
Jingle a set of keys in front of the wall module and observe what happens. The light will turn off. (For local Minnesota resources see "References" section.)

WORDS+LIVING CENTER III: Words+, Inc.

- Single switch augmentative communication system/living aid for children and adults with severe disabilities
- System includes environmental control, picture drawing capability, word processing, music generation, games
- User must be able to read
- Voice synthesizer
- Compatible with IBM PC and PCjr
- Computer knowledge or experience not necessary to run system
- Cost for full capacity system with voice output and 80 column printer is less than $2,400

3. Demonstrate an environmental control system (15 minutes). Activity: Connect 3 different appliances to an environmental control system. Turn the devices on and off with the environmental control.

For example: Using the TASH ULTRA-4 system, plug in a radio, a cassette player, and a lamp. Turn the devices on and off with the wireless hand control.

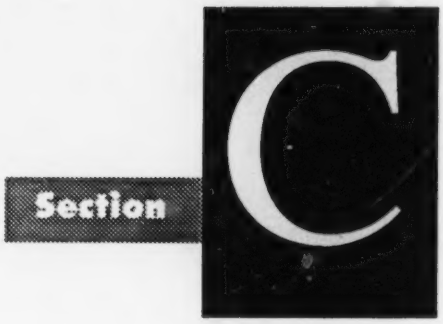
Remind students that they also have with their materials a list of controls that allows people who are non-speaking to operate devices through a computer.

4. Divide the class into small groups of three to four students each. Have each group brainstorm a list of stores in their area where they can buy adaptive equipment. Be creative in shopping, e.g. toy stores, department stores, building supply, etc. not just specialty electronic stores.

Also, have them describe individuals whose daily life and independence could be improved with specific devices. (20 minutes)

5. Conduct a large-group discussion about the findings reached in step 4. (15 minutes)

6. Encourage the students to use the list of stores and go window shopping for these devices. Have them create a price list so they can see the cost of making a major difference in a person's life. (5 minutes)



Adaptive Devices Video

Format

Videotape/discussion

Time

45 minutes

Materials

"Richard Dodds on Technology" videotape
Video cassette player and monitor

Objectives

1.0 Recognize the role technology plays in the lives of people with disabilities.

Notes

1. Show the videotape "Richard Dodds on Technology."

2. Lead a discussion of the videotape. Emphasize the points listed.

Section C: Content

Adaptive devices can:

- Allow people to control objects in their environment, which is a constant learning process.
- Help people feel good about themselves.
- Enable people to do things that are best for their physical health.
- Increase people's independence.
- Increase the ease of work and level of productivity.
- Improve communication.

Adaptive Devices

Format

Lecture/demonstration/discussion

Time

55 minutes

Materials

Overheads 17 – 19

Equipment/devices to use in demonstrations

Objectives

Upon completion of this section, students should be able to

6.0 Describe the steps used to decide on adapting a device.

- 6.1 Conduct an assessment of commercially available equipment.
- 6.2 Identify possible modifications of commercial aids.
- 6.3 Describe adaptations of non-rehabilitation devices.
- 6.4 Request information from others.

Section D: Content

The goal of this section is to outline procedures for adapting devices. This includes a discussion of how to modify a device if an adaptor is necessary and possible resources for purchase.

We should now understand the importance of using technology to make people with disabilities more independent. There are many persons and companies we can use as resources in finding the right equipment for each person.

However, it is very important for you to remember that technology is not something that is only the business of certain experts. It cannot be scheduled into a certain time slot like speech therapy, music therapy, medication, or bathing. When you work with persons with disabilities, you should be thinking of ways to use technology all the time. You are the people who see the problems, you can most likely come up with good solutions. The result will be more independence for persons with disabilities and more job satisfaction for you.

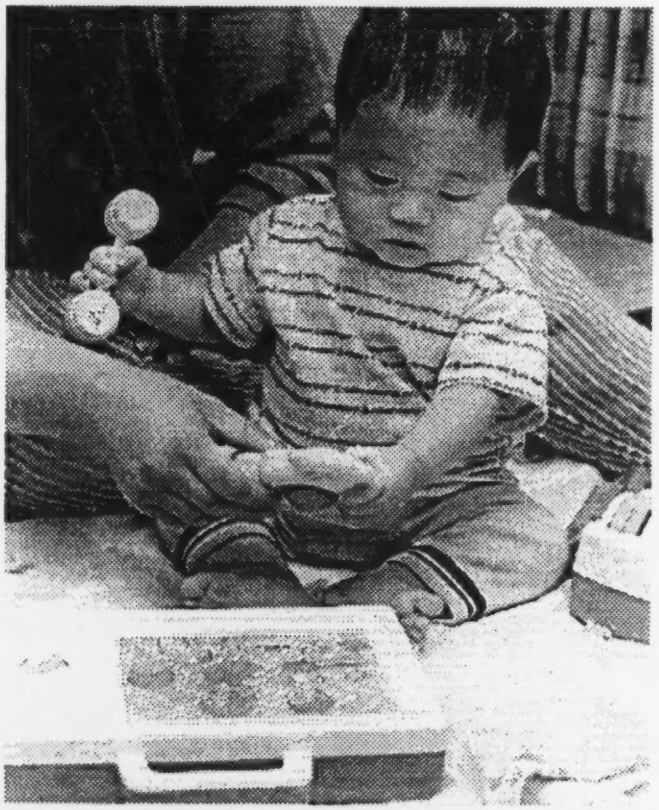
When choosing a particular device it is always easiest when there is a commercially available item that meets the specific needs. If this is not the case the next best solution is to do slight alterations. The last resort is to fabricate or make a completely new device.

Notes

1. Using overheads 17,18 and 19, and the content provided, introduce the concept of adaptive devices and appropriate approaches. (5 minutes)

This last choice is probably not a possibility for most of us, but if you can clearly describe the problem and suggest solutions, there is likely someone who can pull it all together. Before going to this extreme, it is helpful to contact other agencies, advocacy groups, or persons with a similar disability to see if something has already been made, instead of inventing a one-of-a-kind device.

Such information sharing is very important, and do not forget to include persons working outside of the human services field. Mechanics, builders, computer buffs and general tinkerers can be valuable resources in making adapted devices.

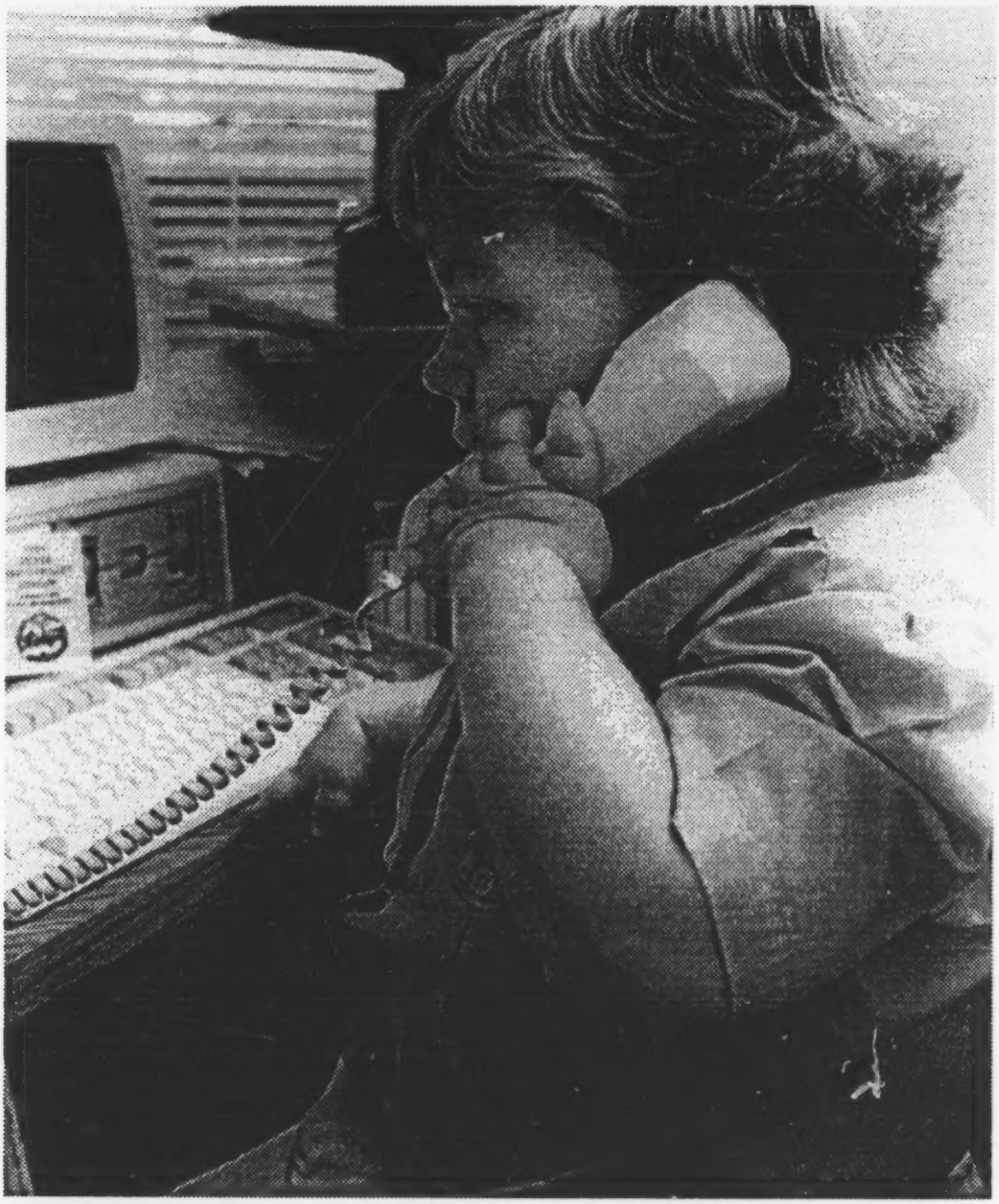


2. Describe the step of assessing commercially available equipment by evaluating functional use and cost-effectiveness. Recall the earlier example of robotic arms vs. a straw. (5 minutes)

3.Demonstrate that in some cases the only requirement is a minor adjustment, fitting or additional component. Use an example of an individual who happens to not have arms. Even though "robot" type arms may seem OK, they may not be practical, and it would be better to use long straws, or items that can be activated with mouth controls. (10 minutes)

4. Request class input on devices they currently see in their work that were not especially developed for persons with disabilities. Use an example of an individual who is unable to reach elevator buttons. Rather than lower all the elevator buttons, we provide the individual with one leg of a tripod. In this way the person can open the tripod and push the button on any elevator. (20 minutes)

5. Ask students to identify who they would ask in their work environment for help in adapting a device. (15 minutes)



Section E

Computer Use

Format

Lecture/demonstration

Time

65 minutes

Materials

Overheads 20 – 21

Handout 3: Apple Computer Basics

Equipment/devices to use in demonstrations

Objectives

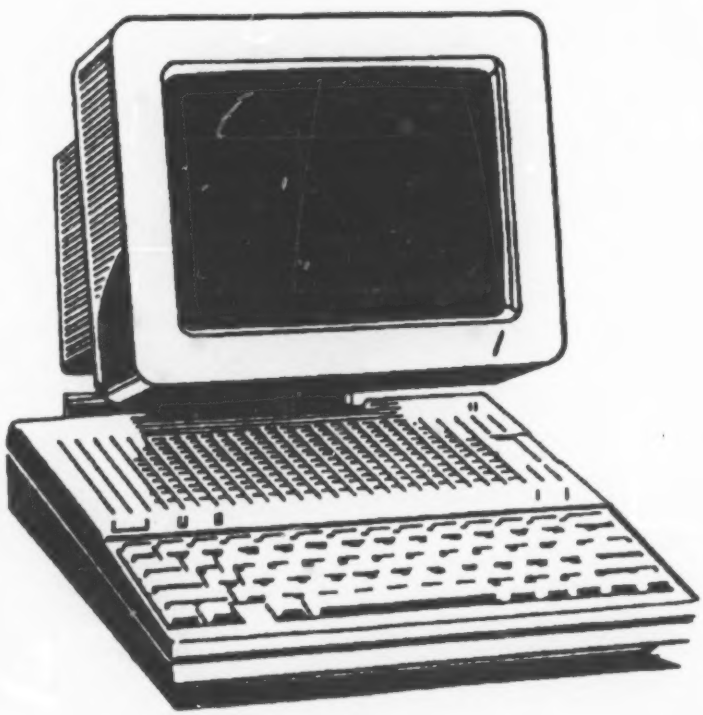
Upon completion of this section, students should be able to:

7.0 Describe ways in which computers can be used to assist people with disabilities.

7.1 List the four major jobs a computer can perform.

7.2 Identify at least three assistive devices.

7.3 Describe at least two kinds of software.



Section E: Content

The goal of this section is to provide an overview of computer use, equipment and applications for persons with disabilities.

If you do not know anything about computers, you are probably one of the many people who say "and I don't want to know." However, you really can't avoid it even in your everyday life.

You've probably already been told that a computer cannot think. It will do only what it is told to do. If you give it the wrong information, it will politely do what it is told, and completely mess up!

The computer's major advantage lies in its ability to handle large amounts of information at great speed. It loves to perform repetitive tasks. That is really helpful since we all have better things to do. A computer is built to do four jobs: 1) accept information, 2) store information, 3) process information, 4) give back processed information.

Included in the student handouts is a list of definitions titled "Apple Computer Basics;" 12 pages explaining Apple basics; a list of types of educational software; and an information sheet on how to handle disks. Students can keep all these for future reference when they are more familiar with computers in general.

Notes

1. Using the content provided and overheads 20 and 21, explain how computers assist people with disabilities to achieve greater independence. (10 minutes)

What you need to know is that computers can be used in many different ways to assist persons with disabilities. They can be used to assist in education, recreation, independent living, and mobility. Besides special applications, persons with disabilities need to operate computers for the same reasons that everybody else uses computers; that is to operate programs in schools, homes, and businesses.

Depending upon a person's ability, there are many different devices that can be used to give him/her access to the computer.

FOUR MAJOR JOBS A COMPUTER CAN DO:

- Accept information
- Store information
- Process information
- Give back processed information

COMPUTERS CAN ASSIST INDIVIDUALS WITH DISABILITIES IN:

- Education
- Recreation
- Independent living
- Mobility
- All the ways others use them

2. Identify and describe various assistive devices and adaptive input/output devices: power pad, muppet keys, touch window. Use overhead page 145 - 149. Bring examples of these devices to demonstrate to students. (15 minutes)

3. Identify and describe what software means, and describe five types of software that are of value in assisting individuals with disabilities: tutorial, drill and practice, educational game, simulation, and tool. Use overheads 135 and 136. (10 minutes)

4. Select an assistive device and demonstrate software and explain the purpose and benefits to an individual with a disability. (20 minutes)

5. Encourage students to take some time, outside of class time, to familiarize themselves with one program and then choose an assistive device and try operating the program like a person with a disability would. Record any differences for future discussion. (5 minutes)

Remind them that it is important to note that their role as direct care staff will not be to operate the computer or to program a computer. What they must really know is:

- Computers exist
- People with disabilities can use computers with adaptations.
- Attitudes of professionals may be preventing use of computers.

Section F

Course Summary

Format

Lecture

Time

15 minutes

Materials

Handouts for all sections

Notes:

1. Summarize the main points of this class, and answer any questions from students.

2. Pass out any handouts not yet distributed; including copies of all overheads for Session 2.

Section F: Content

In summary, persons with disabilities can live more independently through technology. The most controversial issue related to providing technology services is the expense of the equipment.

What we have seen is that most equipment is relatively inexpensive and even the equipment that does cost significant amounts of money should be purchased because it is ethically correct.

Another important point is that the more independent a person can become, the more of an asset he/she will be to society. The quicker we apply technology to persons with disabilities the quicker people will go to work.

Fostering dependence and segregation (i.e. no way to communicate or get around) will only result in long term cost and personal frustration. Investing in the future of individuals with disabilities through technology will result in a greater return on the original dollars invested.

Technology

SESSION 1

A. OVERHEAD 1

C. OVERHEAD 2 – 5

D. OVERHEAD 6

E. OVERHEAD 9

F. OVERHEADS 10 – 12

SESSION 2

B. OVERHEADS 13 – 16

D. OVERHEADS 17 – 19

E. OVERHEADS 20 – 23

COURSE GOALS AND OBJECTIVES

1. Recognize the role technology plays in the lives of people with disabilities.

2. Identify the first person they should speak to when considering the use of technology for a person with a disability. They should be able to list three other considerations to make.

3. Identify the three uses for positioning and seating.

4. Identify the uses of two different types of wheelchairs and describe appropriate uses for each.

5. Describe and demonstrate the use of an environmental control system.

6. Describe the steps used to decide on adapting a device.

7. Describe ways in which computers can be used to assist people with disabilities.

WHY TECHNOLOGY SERVICES ARE IMPORTANT.

Seating/Positioning

- Increases stability, thereby increasing the range of motion of the arms and the scope of vision
- Prevents aggravation of scoliosis and spasticity
- Allows for individual to join in group activities
- Increases learning potential
- Improves appearance

Mobility

- Increases individual's awareness of surroundings
- Facilitates independence
- Allows individual to control his/her environment
- Improves individual's spatial perception
- Encourages communication

Augmentative Communication

- Allows individual to express wants, needs and thoughts
- Essential tool for education
- Facilitates socialization
- Increases individual's independence

Educational Technology Services

- Increases opportunities to learn through adaptive equipment, mobility and augmentative communication devices
- Enables individuals to learn in a least restrictive environment
- Increases social integration into the community

Employment Technology Services

- Increases employability through adaptive equipment, mobility and augmentative communication devices
- Increases independence/productivity

Resource/Information Referral

- Increases awareness of the abilities instead of disabilities of individuals through the use of technology
- Increases professional's expertise
- Reduces the inappropriate selection of devices for individuals
- Cost-effective

Computer Access/Learning

- Essential tool for education
- Allows individuals to control something in the environment
- Alternative means of communication
- Provides entertainment
- Increases competitive employment opportunities

Environmental Controls

- Increases independence
- Affords individual greater control of their home, school or work place
- Creates employment opportunities
- Provides opportunity for recreation

INDIVIDUAL ASSESSMENT

A. ASK QUESTIONS.

Example:

Betty is Ted's case manager and she asks him if he has any difficulties operating devices around the house. Ted, who is a person with cerebral palsy and is unable to use his fingers, says he has trouble turning on and off lights.

B. OBSERVE.

Example:

Doris uses a manual wheelchair. When she and her personal assistant Helen go food shopping, Doris gets very tired from wheeling through the store. Helen always has to wait for Doris to catch up with her to make decisions about the food to buy. Helen would like to push Doris, but can't push her at the same time as she pushes the grocery cart.

C. LOOK AT ABILITIES.

EXAMPLE 1:

Ted, who is unable to use his fingers, can use his feet very well. In fact he paints pictures by holding a paint brush between his toes.

EXAMPLE 2:

Doris can sit up easily and has full use of her hands and arms. She has a job at a factory assembling vacuum cleaners.

D. LOOK AT ENVIRONMENT.

EXAMPLE:

Jenny is a 13-year-old girl who is independently mobile in a power wheelchair. She uses a computer to do her homework on at school. She cannot take the computer home because it is too big and has many wires to connect and they are always breaking.

E. ASK FOR INFORMATION FROM OTHERS.

EXAMPLE 1:

Helen, Doris' morning assistant, said that another woman she worked with had a power wheelchair with a basket on the front. She could do a lot of the small shopping trips herself and never get tired.

EXAMPLE 2:

Jenny's father said he had seen a small, portable version of the computer Jenny uses in school and could easily hook it up so she could use it to do homework.

SEATING AND POSITIONING SYSTEMS CAN:

- Prevent skin sores in areas bearing the body's weight.
- Assist in holding a person upright to allow them to:

  Communicate
  Be Independently Mobile
  Eat
  Work
  Play

- Help promote function and mobility.
- Prevent spinal conditions.

SIMILARITIES

Manual Wheelchair	**Power Wheelchair**
Footplates	Footplates
Front caster wheels	Front caster wheels
Frame	Frame
Seat and Back	Seat and Back

The differences between wheelchairs make the selection of the best chair a careful process.

EXAMPLE 1:

Bob is a 22-year-old man who became paralyzed following a car accident. He is able to use his arms well and has an adapted car. His wheelchair needs to be light enough that he can lift it into his car.

EXAMPLE 2:

Carol has a hard time using her manual wheelchair in the factory where she works. It takes her a long time to go from one end of the building to the other. When she gets to work she transfers to a three wheeled power chair. She is able to move around the factory easily this way.

DIFFERENCES

Manual Wheelchair	**Power Wheelchair**
Hand rims	Joystick
30 to 75 pounds	150 to 275 pounds
Easier to transport	Battery
No motor	Motor
Requires more physical effort	Louder in sound

ENVIRONMENTAL CONTROL SYSTEMS

Allow people with physical disabilities, and who are non-speaking, to operate various electrical devices in their surroundings.

CONTROL 1

Prentke Romich Company

- Responds to computer commands issued from a variety of input devices
- Controls lamps, radio, television, electric bed, telephone, intercom, power drapery, page turner, call signal, etc.
- Modular components
- Compatible with IBM PC
- Cost varies according to components required

HOME AUTOMATION LINK

The Voice Connection

- Voice activated control of telephone dialing, lights, appliances, television, radio, etc.
- Interfaces with personal computer via IntroVoice III circuit board
- Optional devices available
- Compatible with IBM PC and PC/XT
- Cost $500 plus IntroVoice III

MOD KEYBOARD SYSTEM

National Research Council of Canada

- A family of plug-in cartridges designed for people with disabilities which require a variety of input interfaces and applications
- "Elementary" MOD Keyboard for children
- Morse code option
- Analog input version with a smoothly moving cursor
- Auto display feature
- Compatible with standard software
- Compatible with IBM PC
- User-definable word-phrase pages

WORDS+LIVING CENTER III

Words+, Inc.

- Single switch augmentative communication system/living aid for children and adults with severe disabilities
- System includes environmental control, picture drawing capability, word processing, music generation, games
- User must be able to read
- Voice synthesizer
- Compatible with IBM PC and PCjr
- Computer knowledge or experience not necessary to run system
- Cost for full capacity system with voice output and 80 column printer is less than $2,400

WHEN ADAPTED DEVICES SHOULD BE CONSIDERED:

When nothing
suitable is commercially
available.

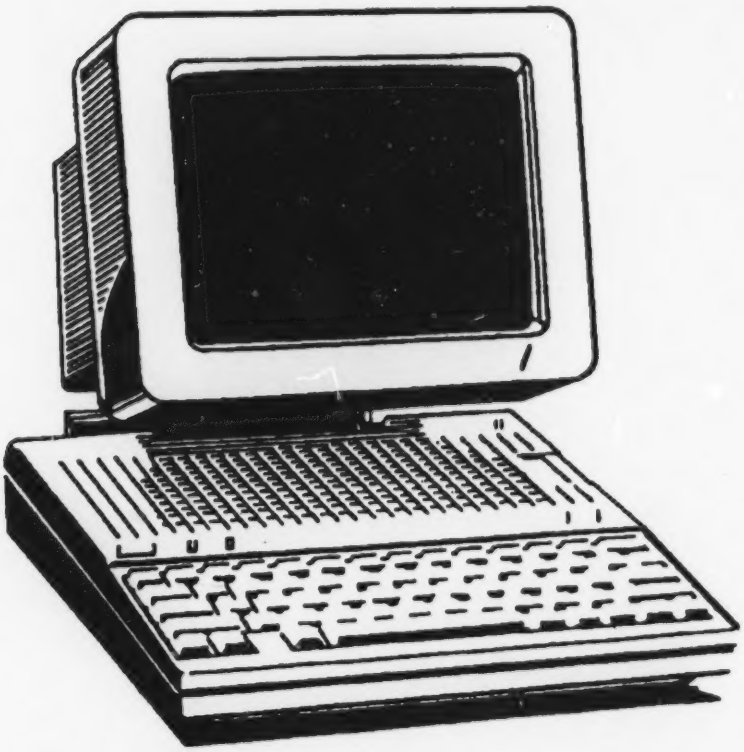
RESOURCES FOR ADAPTING DEVICES THAT SHOULD BE CHECKED:

- Rehabilitation catalogs
- Agency inventory
- Other inventory

WHO SHOULD BE INVOLVED:

- The individual with the disability
- The individual's family
- The direct care staff
- The professional staff
- Whoever can come up with a better idea

JOBS A COMPUTER CAN DO:



- Accept information
- Store information
- Process information
- Give back processed information

COMPUTERS CAN ASSIST INDIVIDUALS WITH DISABILITIES IN:

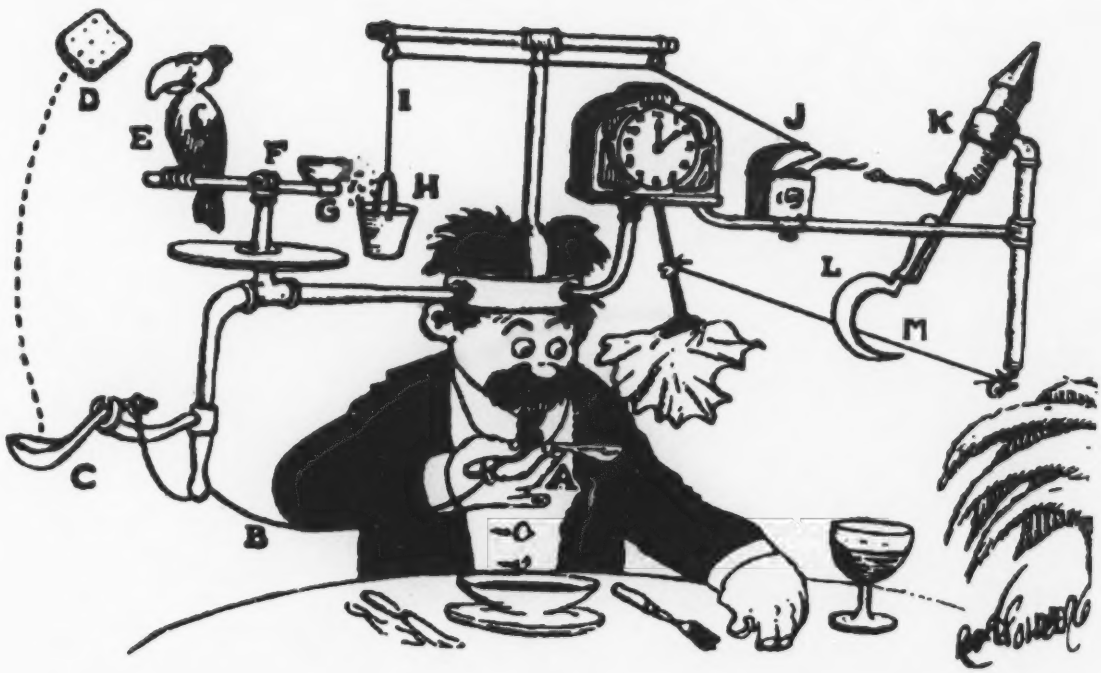
- Education
- Recreation
- Independent living
- Mobility
- All the ways others use them

COMPUTER ACCESS

- Keyboard
- Keyguard
- Keyboard Covers
- Moisture Guards

TYPES OF EDUCATIONAL SOFTWARE

- **Tutorial**
  Instruction
- **Drill and Practice**
  Reinforcement of related skills or concepts
- **Educational Game**
  Drill and practice
- **Simulation**
  Enables students to explore making decisions
- **Tool**
  Performs specific function, saves time and energy



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Basic Checklist for Assessment

Name: _____

Date: _____

Date of Birth: _____

Reason for requesting assistance.

_____

_____

_____

_____

Abilities.

_____

_____

_____

_____

_____

Where is the adaptive equipment going to be used?

_____

_____

_____

_____

How many steps into the building are there? _____

How wide are the doors? _____ inches? _____

Is there another way in or out? _____

Are there enough outlets? _____

How will the device be transported?

_____

Who else might have some information?

Name:	Relation: (eg: friend, parent, counselor)
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Handout 1

Guidelines for Using Wheelchairs

1. THE RUBBER COVERS ON THE HAND GRIPS
They should always fit tightly for safety.

2. ARMRESTS:
   a. May be removable so they can be taken off for transfers.
   b. Desk-arm style armrests are cut lower in front to fit under a table.

3. SEATS:
Many people will have special cushion inserts in their chairs.

4. SEATBELTS:
All wheelchairs have seatbelts, which should be fastened around the person whenever he/she is in the chair.

5. STRAPS:
Some people may need straps to help support different parts of their body and maintain correct position.

6. LEG REST ASSEMBLY:
This part of the wheelchair consists of foot plates and calf pads.
The leg rest assemblies may:
   a. Swing away
   b. Adjust to elevate legs
   c. Be detachable

7. WHEELS:
All wheelchairs have four wheels, two small ones in the front, and two large ones in the back.

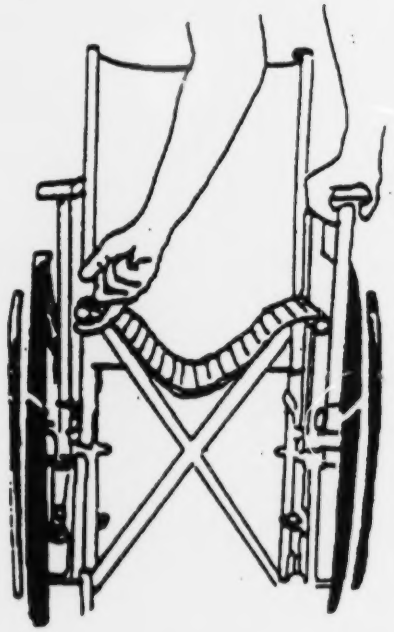
a. The large wheels usually have a hand rim for propulsion.
b. The large wheels contain brakes, which need to be set whenever the wheelchair is stationary.

8. TIPPING LEVER:
Used to tip the chair back when the chair goes up or down a curb.

9. ANTI-TIPPER:
Used on wheelchairs to prevent tipping over backward or forward.

10. TRAYS:
Used by some people to help in positioning and activities.

ALL WHEELCHAIRS CAN BE WIPED DOWN WITH A DAMP CLOTH AND MILD DETERGENT.
DO NOT PUT WHEELCHAIR IN SHOWER.



FOLDING WHEELCHAIRS:

1. Remove or fold up leg rest assembly.

2. Place hands on front and rear of seat, and gently pull up; this will cause the chair to fold.

3. Wheelchairs with solid seats usually cannot be folded.

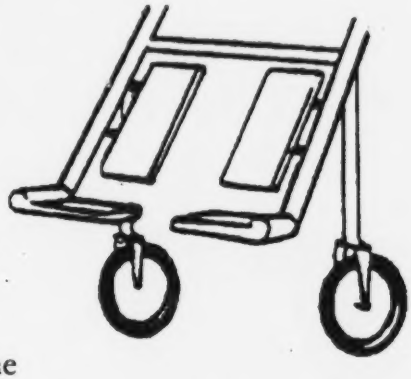
GUIDELINES FOR WHEELCHAIR SAFETY:

Any time a person is in his/her wheelchair, the following guidelines should be followed:

1. The seatbelt should be fastened.

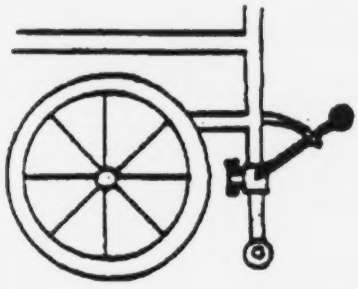
2. The person's feet should be on the footrests.

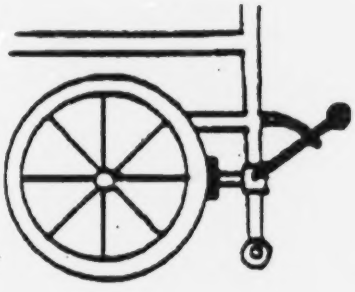
3. All straps should be fastened.



4. Be sure that the person's hands and fingers will not get caught in the wheel spokes.

5. The brakes are always locked when the wheelchair is stationary.





6. The staff member should wear low-heeled shoes with covered toes to protect his/her feet when working in an area with wheelchairs.

PUSHING A WHEELCHAIR:

1. Over rough terrain or a raised area:

a. Tilt the wheelchair by stepping down on tipping lever with foot, as you pull down and back on hand grips.

b. Continue to tilt chair back until it requires little or no effort to stabilize it.

c. When the wheelchair is at the balance point, it can then be pushed over obstacles or terrain.

d. Reverse the procedure and lower slowly. Make sure the wheelchair does not slam down or drop the last few inches.

2. Over curbs and steps:

a. As you approach the curb or step, pause and tilt the wheelchair back to the balance point.

b. When the wheelchair is stabilized, move toward curb until casters are on curb, and rear wheels come in contact with the curb.

c. Move in close to the chair, and lift the chair up by the handles. Roll the wheelchair up over the curb, and push it forward.

d. To go down, reverse the steps - back the wheelchair down off the curb, without allowing it to drop down. Once rear wheels are down, step down on tipping lever and slowly lower casters.

3. Going down a steep incline:

a. Take the wheelchair down backwards.

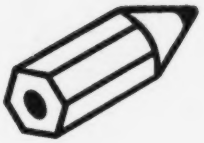
b. The wheelchair can pick up speed too easily and you can lose control if the wheelchair goes down first.

c. Turn the chair around until your back is in the direction you plan to go.

d. Walk backwards, and move slowly down the ramp.

e. Look backward occasionally to make sure you are staying on track and to avoid collision.

Handout 2



Environmental Control Systems

ALLOW PEOPLE WITH PHYSICAL DISABILITIES, AND WHO ARE NON-SPEAKING, TO OPERATE VARIOUS ELECTRICAL DEVICES IN THEIR SURROUNDINGS.

CONTROL 1 – Prentke Romich Company

- Responds to computer commands issued from a variety of input devices
- Controls lamps, radio, television, electric bed, telephone, intercom, power drapery, page turner, call signal, etc.
- Modular components
- Compatible with IBM PC
- Cost varies according to components required

HOME AUTOMATION LINK – The Voice Connection

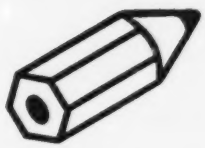
- Voice activated control of telephone dialing, lights, appliances, television, radio, etc.
- Interfaces with personal computer via IntroVoice III circuit board
- Optional devices available
- Compatible with IBM PC and PC/XT
- Cost $500 plus IntroVoice III

MOD KEYBOARD SYSTEM – National Research Council of Canada

- A family of plug-in cartridges designed for people with various disabilities which require a variety of input interfaces and applications
- "Elementary" MOD Keyboard for children
- Morse code option
- Analog input version with a smoothly moving cursor
- Auto display feature
- Compatible with standard software
- Compatible with IBM PC
- User-definable word-phrase pages
- Contact vendor for price information

WORDS+LIVING CENTER III – Words+, Inc.

- Single switch augmentative communication system/living aid for children and adults with severe disabilities
- System includes environmental control, picture drawing capability, word processing, music generation, games
- User must be able to read
- Voice synthesizer or compatible with IBM PC and PCjr
- Computer knowledge or experience not necessary to run system
- Cost for full capacity system with voice output and 80 column printer is less than $2,400



Apple Computer Basics

"I could never use a computer!" "I won't touch those things!" "What if I hit the wrong key? Will I blow the computer up?" These statements and questions have been voiced by parents and professionals many times. They most likely come from lack of experience and a fear of technology.

Many beginning computer users are fearful and anxious about microcomputers. These feelings usually subside when they become familiar with the basic workings of the computer. This section of the manual will help provide a basic understanding of the Apple II microcomputer.

What Is A Microcomputer?

The microcomputer is one type of computer. It may be referred to as a personal or desktop computer. The microcomputer is a device that carries out specific instructions. The instructions come from software programs which are stored on cassettes or disks. The Apple II computer uses disks to obtain and store information. There are software program disks which come in various sizes. You will most likely use a floppy disk that is either 3.5 inches or 5.25 inches depending on the type of Apple computer you are using.

THE APPLE SYSTEMS HAVE FIVE BASIC COMPONENTS:

1. **Computer or CPU** (Central Processing Unit): There are four basic hardware components to the CPU. These include:

   A. THE PROCESSOR: Carries out sequences of instructions (called programs) stored in an area of the computer's main memory.

   B. MAIN MEMORY: Stores programs when the computer is running. The portion of the main memory not occupied by currently running programs is available for storing information entered by the keyboard.

   C. THE KEYBOARD: Built into or attached by a cord to the computer. It is one of the means of sending information to the computer. You can type text or send controlling information through the keyboard.

   D. THE SPEAKER: Built into the computer and used to produce sound effects: for example, a beep to indicate a successful startup or an unrecognized command. The speaker can also produce musical tones.

2. **Display Device/Monitor** The monitor is the T.V.-like screen that allows you to see text and graphics. It is the computer's means for conveying information to you. There are many types of monitors available, such as color monitors, monochrome monitors, and monitors that can be switched from color to monochrome.

3. **Disk Drive** The disk drive reads and writes information on a magnetic disk for repeated use, much the same way a tape recorder plays back and records music. The process of transferring information from the disk to the computer is called "BOOTING" or "LOADING" a program. Whenever you turn off the computer, the information in main memory is lost. But what you have saved on a disk is still available to load back into main memory after you turn the computer on again.

4. **Software Programs (Floppy disks)** These are to a disk drive what tapes are to a tape recorder. Some disks have programs or other information already recorded on them and others are completely blank.

   The term software refers to programs available on disks or cassette. There are millions of software programs available, on topics ranging from business to drawing to games. These software programs are what allow ordinary, everyday people to use microcomputers. Good software programs come with manuals and instructions that tell you exactly what to do. No programming knowledge is necessary!

5. **Printer** It is not necessary to have a printer in order to run a computer. The printer is used to print information that has been put into the computer so that you have a permanent copy. There are black and white and color printers. Color printers are used for printing charts, graphs, and pictures. The printers that do this kind of printing, whether black and white or color, are called dot-matrix printers. Other printers only print letters like a typewriter. These are called letter quality printers.

APPLE COMPUTERS FOR CHILDREN WITH SPECIAL NEEDS

Why Apple computers? The majority of software developed for educational purposes is made first for the Apple line of computers and second for IBM, Tandy, Commodore, etc. Apple computers are extremely adaptable for special needs populations in terms of individualizing input and adding devices such as speech synthesizers, touch pads, and switches. The following Apple systems have all been used with children with special needs for various purposes. A brief description of each system is given below.

Apple II Plus The Apple II Plus is the oldest of Apple's educational computers. Apple no longer manufactures this model but it is still being used in many schools, homes, and therapy centers. This model comes with 48K and is expandable to 64K only. The keyboard does not have up or down arrow, delete or open and closed apple keys. It has 8 slots, 7 general-purpose and 1 for memory expansion. This model can be opened up and is easily adapted for special needs populations. It includes an internal gameport only.

Apple IIe The Apple IIe is what will be found in most special education settings. This model comes with 64k and can be upgraded to 128k and beyond. It has additional function keys such as up and down arrows, open and closed apples, and delete keys. Some of the newer models also include a numeric keypad. It has seven slots, 7 general purpose and 1 for many expansion. This model can be opened up and is easily adapted for special needs populations. Adaptive equipment is readily available for this model. It includes both internal and external gameports.

Apple IIc The Apple IIc can also be found in educational settings. It is the most portable of the Apple educational family. It comes with 128k. The keyboard contains the same keys as the Apple IIe but is detached. It includes ports for a serial printer, modem, monitor, mouse, joystick and a choice of 3.5 or 5.25 inch drives. It cannot be opened and does not include slots for additional equipment. It includes an external gameport only.

Apple IIGS The Apple IIGS is the newest Apple educational model. It comes with 256k and is expandable. The keyboard is detached and includes a numeric keypad. The option key replaces the closed apple but generates the same code. It has 8 slots: 7 general-purpose: 1 for memory expansion. Ports are for serial printer, modem, monitor, 3.5 and 5.25 inch drives, mouse, joystick and apple talk. The IIGS can be opened and is easily adaptable. It includes both internal and external gameports. This model has enhanced graphics and sound capabilities.

Most software programs will run on all Apple models depending on how much memory is needed for the software to work. Some programs which were made for the IIe and IIc may have trouble running on the new IIGS. Software made to utilize the IIGS' enhanced graphics and sound capabilities will not run on any of the other models.

The two models recommended for people with special needs are the Apple IIe and the Apple IIGS. Both are easily adaptable, and specialized equipment is also readily available for them.

HOW DOES IT ALL WORK?

First, always read the manual that comes with the computer. If you do not have one, write to the company to obtain one. The manual will give you instructions on how to connect the various hardware components in order to get the computer running. The instructions in the Apple manuals are very thorough and simple to understand.

Once the computer is ready to use, select a software program. You will "BOOT" or "RUN" the program. Take the disk out of the jacket and hold it at the top, where the sticker is.

Do not touch the exposed areas in the middle or at the bottom.

Damage to the disk can occur if dirt or oil gets in this area. Insert the disk in the drive, sticker facing up and the exposed area going in first. Close the disk drive door. Turn on the monitor and the computer. You will hear a whirring sound and the red light on the disk drive will go on. This means that the disk drive is "BOOTING" your disk and transferring information from the disk into the CPU or computer. The computer monitor or screen should give you instructions on what to do next.

When finished with the program, take the disk out of the disk drive, (make sure the red light on the drive is off) and turn the computer and monitor off. Place the disk back in its jacket and in a storage case. You have just run a software program!

WHEN RUNNING A SOFTWARE PROGRAM THE FOLLOWING EVENTS OCCUR:

1. The disk drive reads information from the software program disk.

2. The information is transferred into the computer from the disk drive.

3. The computer takes the information and displays it on the monitor for the user to respond to.

4. The computer then responds to input from the user.

DISK SAFETY PRECAUTIONS

1. Always hold the disk at the top where the sticker is.

2. Never touch the shiny exposed area at the bottom or middle of the disk.

3. Never place disks ON TOP of the disk drive. The drive contains a magnetic device that can erase all the information on your disk.

4. Carefully insert the disk before you turn the computer on and carefully remove it before you turn the computer off. Never take a disk out, or put a disk in the drive when the red light is on.

5. Always place disks back in disk jackets when finished.

6. Keep the disks away from extremes of heat and cold.

7. Don't make imprints on the disk. (No paper clips or ball point pens)

8. Don't put the disk near a fan, microwave or any other source of magnetic power.

9. Don't put other materials on top of the disk.

10. Don't allow smoke or liquids to come in contact with the disk.

11. Obtain or make back-up copies of all your program disks, especially your data disks.

ADAPTIVE EQUIPMENT

Adaptive equipment should be utilized to make the physical manipulation of the computer simple so that the person can concentrate on the activity that is being presented. There are many ways to adapt a computer to make it accessible to people with special needs. A list of adaptive equipment and input devices is given below.

COMPUTER ACCESS

Keyboard The keyboard can be used for direct selection by some people, with little or no effort. The persons may need colored stickers on specific control keys as reminders or they may be able to locate specific letters.

For many people with special needs the keyboard is extremely distracting. The number of keys available for manipulation may distract individuals from participating in computer activities. This problem can be solved through the use of various adaptive devices which are all commercially available.

Keyguard A keyguard is a rectangular piece of plastic or metal that fits directly over the keyboard. Holes are pre-drilled into the guard to correspond to each key on the keyboard. The keyguard was originally developed for adults with physical handicaps who had minimal fine motor control. It allowed them to locate keys accurately with a finger or stick. It can also be used with children whose disabilities range from physical handicaps to mental retardation.

Available from Don Johnston, P.O. Box 639, 1000 N. Rand Rd., Bldg. 115, Wauconda, IL 60084, (312) 526-2682. Also from Tash, 70 Gibson Drive, Unit 1, Markham, Ontario, Canada, L3R 2Z3 (416) 475-2212.

Keyboard Covers A keyboard cover is a plastic board that is separated into two large plates. It lays on top of the keyboard and is held in place by velcro. Knobs are placed on the back of each plate to correspond with specific keys. When a child hits a plate it activates a key. This device works with programs that use only two keys for the majority of input.

Available from Steve Kanor, Ph.D., Inc., 8 Main STreet, Hastings-on-Hudson, NY 10706, (914) 478-0960.

Moisture Guards A moisture guard is a piece of plastic that is molded to fit a variety of keyboards. It protects the keyboard from dirt and moisture. Available from Don Johnston (see keyguard for address).

PERIPHERALS

A peripheral is a device which can be attached to the computer such as a printer, disk drive, or joystick. Many plug into the gameport which is located in the back of the computer in the Apple IIe and is inside the computer in the IIc. Some peripherals, such as touch tablets and switches, need a gameport extender or switch interface.

Gameport extender (scooter) The gameport is an outlet inside the computer that some devices need to be connected to. The gameport extender brings the gameport outlet to the outside of the computer so that equipment can be connected easily. This device is essential for use with Powerpad since it needs to be connected and disconnected often.

Available from Don Johnston, P.O. Box 639, 1000 N. Rand Rd., Building 115, Wauconda, IL 60084 (312) 526-2682.

Switch interface A switch interface connects to the gameport or gameport extender. It allows a single or double switch to be attached to the computer and used for input for software programs.

Available from Don Johnston, P.O. Box 639, 1000 N. Rand Rd., Building 115, Wauconda, IL 60084 (312) 526-2682.

Joystick A joystick has a control stick and two "FIRE" buttons which control the software program. The movement of the stick may control one part of the program while the "FIRE" buttons control other parts. Some software programs are made to work specifically with the joystick. It is important that the joystick have the fire button on the side of the box (not on the top of the stick) so that children can access the button. Joysticks can be obtained at local software or computer stores.

PowerPad The PowerPad is a touch sensitive board that plugs into the internal gameport. The software programs made for this peripheral come with picture overlays. The child pushes certain sections of the board to give specific commands.

Available from DUNAMIS, 2856 Buford Hwy., Duluth, GA 30136 (404) 923-0485. It can also be obtained from Don Johnston.

Muppet Learning Keys This is a touch sensitive tablet similar to the PowerPad. It contains the alphabet, numbers, and colors. Programs made for this tablet may use all the keys for input or just a few.

Available from Sunburst Communications, 39 Washington Ave., Pleasantville, NY 10570-2898, 1-900-431-1934.

Touch Window The touch window is a transparent, semi-rigid plastic screen that is placed over the computer monitor. The person touches certain areas on the screen to give commands to the computer. The person only has to look at and touch the monitor to interact with the computer, bypassing the keyboard completely.

Available from Micro Touch Systems, Inc., Ten State Street, Woburn, MA 01801, (817) 935-0800.

Game Paddles Game paddles (2) are used mostly for arcade game programs, though they have been used with other programs as well. Each one has a knob and a "fire" button. They are similar to the joystick except that the knobs must be turned to manipulate the computer. Specific fine motor skills are involved. Paddles can be purchased at local computer or software stores.

Mouse The mouse is a rectangular plastic box about the size of your palm. It is manipulated by moving it around on a table and pressing its "fire" button, and works much like a joystick. It works only with programs made specifically for its use. The mouse can be purchased from your local Apple dealer.

Single Switches Single switches can be purchased in many forms, shapes, and sizes. There are a few good programs specifically made to utilize switches.

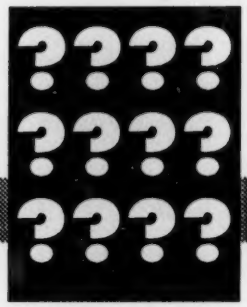
One company that sells switches is Steve Kanor Ph.D., Inc., 8 Main Street, Hastings-on-Hudson, NY 10706 (914) 478-0960.

Adaptive Firmware Card The adaptive firmware card will convert any standard software program so that it can be controlled by a single switch or the unicorn board (a touch sensitive tablet), thus giving people with physical handicaps access to many computer programs. The adaptive firmware card includes a slowdown mode so that games can be played by people with delayed responses. It is inserted inside the computer. The card is available for the Apple IIe, IIGS, and II+ computers.

The adaptive firmware card must be "PROGRAMMED" to work with a switch or Unicorn board (a touch sensitive tablet). It can be programmed to give a "SCANNING" array to any program, and will allow any program to be controlled by a single switch. The alphabet or specific command symbols appear at the bottom of the screen. When the command that the child wants lights up, he/she must activate a switch to give that command to the computer. The child must be able to see the letters on the screen (which are quite small) and understand the connection between the switch, the letters, and the program.

Available from Adaptive Peripherals, 4529 Bagley Avenue N., Seattle, WA 98103, (206) 633-2610.

Unicorn Board The Unicorn board works in conjunction with the firmware card. It is a touch sensitive tablet that takes the place of the keyboard. The amount of contact time needed to activate the board can be altered so that various children can use it. Keyboard letters can be substituted with pictures on this board. It can be used with any piece of software. It must be "programmed" to work with specific programs. Unicorn Engineering Company, 6201 Harwood Avenue, Oakland, CA 94618 (415) 428-1626.



Glossary

WHAT IS REHABILITATION TECHNOLOGY OR REHABILITATION ENGINEERING?

Rehabilitation engineering has been defined as the application of technology to improve the quality of life of people with physical disabilities through a total approach to rehabilitation combining medicine, engineering, and allied health professionals. In addition, rehabilitation engineering means the provision of the physical environment to enable individuals with physical disabilities to perform everyday activities in a workplace, in an educational setting or place of residence.

Rehabilitation technology can, through a rehabilitation engineer working with an interdisciplinary team, enable a nonverbal child with cerebral palsy to communicate and socialize with peers and family members. It can help young professionals adapt their work sites so that they can work more effectively. Such technology can also improve the productivity of persons with developmental disabilities in supported work environments. Rehabilitation engineering can dramatically improve the employment potential of persons with disabilities and enable greater numbers of persons with disabilities to live independently.

Rehabilitation technology services offer training, evaluation, consultation, modification, or fabrication expertise.

Mobility The ability to move from place to place is a large step towards independent living. There are many makes and models of powered and manual wheelchairs available.

Seating systems Fitting the wheelchair to the shape of the individual is necessary to allow maximum function. The correct seating system can prevent skin breakdown caused by pressure sores. Seating systems can be as extensive (and expensive) as a Foam in Place, which uses a redundant around the individual, or as simple as plywood and cut foam.

Augmentative communication aids Manual and electronic communication aids are often the only way a nonverbal individual can communicate and socialize with other people. With the rapid growth in technology these devices have become more sophisticated although much more affordable. Newer electronic communication aids not only print the desired word or phrase but now are able to speak.

Personal computers and modifications Computers can act as super typewriters, calculators, information retrieval systems, and video games as well as therapeutic or educational tools. The type of software or program used will change the way in which the computer behaves. For individuals with disabilities use of computers may be prohibited by reaction time, ability to access the keys, or visual disabilities.

Environmental control Being able to turn on and off the lights, television, or answer the telephone are environmental barriers that people with physical disabilities face daily. Many times, simply making the switch on an appliance larger or easier to access is the solution to environmental control. The ability to control one's own environment is another important step towards independent living, as well as leading to a better self image.

Home/living environment modifications Beyond being able to activate appliances in one's own environment, the building itself may present many barriers to independent mobility or living to individuals with disabilities. Opening doors, climbing stairs or bathing may be limited by the building design or simply the arrangement of furniture.

Vocational adaptations Many times employment is precluded by an inability to appropriately function at a particular work site. Modifications to a work site may include raising the height of a desk, fabricating work areas, or adapting machinery to make it accessible to potential employees with disabilities.

COMPUTER GLOSSARY

Adaptive Firmware Card The Adaptive Firmware Card (AFC) allows a person with a physical disability to run commercially available educational, business, or user-written software using any of sixteen special input methods. The special input methods possible with the AFC include single switch and dual switch (scanning and Morse Code), expanded keyboard capabilities, and keyboard assisting features for individuals using a headpointing device or a single finger. The AFC also offers game paddle emulation and a slowdown mode allowing the user to operate some arcade-type games with one or two switches. The AFC does not interfere with the use of the computer keyboard when installed. Special feature software is included. The AFC is compatible with software using the Language Card (Pascal, etc.) and is compatible with the Z-80 (CP/M) card. Talking Scanner, a program for adding the voice output to the scanning arrays, is included. (Manufacturer – Adaptive Peripherals, Inc. 206-633-2610)

Unicorn expanded keyboard A programmable membrane keyboard with 128 touch-sensitive areas. Any key or group of keys can be defined by the user to represent any string of characters up to 40 characters long. Custom keyboard layouts can be stored on disk and used when desired. (Manufacturer – Unicorn Engineering Company 415-428-1626)

Koala Pad Koala Pad is a pressure-sensitive graphics tablet. Used with the proper software, Koala Pad allows the user to select a position on the computer display screen by touching the tablet with a finger or stylus. Koala Pad comes with two programs: Koala Painter and Graphics Exhibitor. (Manufacturer – Koala Technologies Corporation 408-438-0946)

Muppet Learning Keys Muppet Learning Keys is an expanded membrane keyboard for the Apple II computers. The keyboard's 83 keys are covered with color cartoons of Jim Henson's Muppets characters illustrating the various functions of the keys. The program provided with the keyboard uses color animated graphics and music to teach letters, numbers, and colors. Programs available that use the Muppet Keys are the PEAL Series (PEAL Software) and the Magic Slate (Sunburst Communications). Contact Sunburst about other programs available or in development. (Manufacturer – Sunburst Communications 914-769-5030)

Touch Window Touch Window is a transparent plastic screen that fits over a computer monitor. When Touch Window is used with the right software, touching the screen with finger, stylus, etc., will generate input to the computer. (Manufacturer – Personal Touch Corporation 408-246-8822)

SWITCHES AND ADAPTERS

4-Plate Switch 4-Plate Switch is a set of four switches housed side-by-side. Each switch is activated by pressing down on its rectangular plastic plate. A click you can hear accompanies switch activation. (Manufacturer – Zygo Industries, Inc. 503-297-1724)

4-Switch Joystick 4-Switch Joystick is a joystick lever that may be moved in any of four directions. Moving it in a particular direction will activate one switch. This joystick is also available with an additional pushbutton switch. (Manufacturer – Zygo Industries, Inc. 503-297-1724)

Air Cushion Switch Air Cushion Switch is a sensitive air bellows that, when pushed down, transmits a change in air pressure along a tube, activating a switch. (Manufacturer – ComputAbility Corporation 201-882-0171)

Body Switch The Body Switch is operated by pressure from any convenient part of the body. Switch emits a click you can here when turned on. (Manufacturer – DU-IT Control Systems Group, Inc. 216-567-2906)

Chin Switch Chin Switch is a dual switch operated by pressing the buttons with the chin or other body part. When controlled with the chin, this switch requires one inch of head rotation. (Manufacturer – TASH, Inc. 416-475-2212)

Computer Keyboard Switch Computer Keyboard Switch is a small version of a computer keyboard that functions as a single switch. Pressing any key activates the same switch. (Manufacturer – Kanor, Steven E. Ph.D., Inc. 914-478-0960)

Computer Plate Switch Computer Plate Switch is a plate switch with a picture of a computer keyboard stuck to the surface of the plate. This switch is designed to make the user skilled in striking a computer keyboard to have some effect without the person needing to handle real computer equipment. (Manufacturer – Kanor, Steven E. Ph.D., Inc. 914-478-0960)

Eyebrow Switch This switch is mounted on a visor. A lever projects down in front of the forehead, resting against it. When the user wrinkles the forehead or raises the eyebrow, the switch is activated. A click you can hear is provided with switch activation. (Manufacturer – Words+, Inc. 408-730-9588)

Finger Flex Switch Finger Flex Switch is a switch built into a partial glove. Bending fingers activates the switch. (Manufacturer – Luminaud, Inc. 216-255-9082)

Hand Control Hand Controls are a set of two push switches meant to be used with the Early Learning programs from Marble Systems. The buttons are clearly labeled "YES" and "NO," the two choices the program offers in its switch mode. (Manufacturer – Marble Systems 612-434-3704)

Hand Switch Easy Action Hand Switch is a lever switch designed to be operated by the hand. Activation lever is 2" long. Contact the manufacturer for additional information on this product. (Manufacturer – ComputAbility Corporation 201-882-0171)

Hand Control for Wheelchairs by Hugh MacMillan Head Control for Wheelchairs is a switching unit that uses four tilt switches to move six possible position of the user's head. The control unit is mounted on the user's headband and plugs into the control box of the wheelchair. The six positions are FWD, REV, FWD RIGHT, FWD LEFT, REV RIGHT and REV LEFT. There is also a neutral position. Each of the six positions makes a different momentary SPST closure. (Manufacturer – Hugh MacMillan Medical Centre 416-425-6220)

Head Control Switch Head Control Switch is a single switch activated by being tilted. The switch can be mounted on the head or another body part. (Manufacturer – Burkhart, Linda J.)

Headband Switch Headband Switch consists of an adjustable headband equipped with a switch that has a small paddle for a lever. The paddle rests on the forehead, raising the forehead muscles activates the switch. The paddle rests on the forehead, raising the forehead muscles activates the switch. The paddle must be taped to the forehead. (Manufacturer – Luminaud, Inc. 216-255-9082)

Joystick This joystick has a cylindrical handle and a thin base. Pushing the handle in each of four directions activates one of four devices. Contact the manufacturer for additional information on this product. (Manufacturer - Kanor, Steven E. Ph.D., Inc. 914-478-0960)

Joystick with Pad Switch Joystick with Pad Stick is a four position gated joystick with four slotted directions of movement. The fifth switch is a pad switch used for control action. (Manufacturer – TASH, Inc. 416-475-2212)

Left/Right Rocker Switch Left/Right Rocker Switch is a dual switch activated by pressing the plate on either side. Pressing one activates one switch; pressing the other end activates the other. A click you can hear is produced when switch is turned on. (Manufacturer – Don Johnston Developmental Equipment 312-438-3476)

Magnetic Finger Switch Magnetic Finger Switch consists of a sleeve, containing the magnet, which fits over a finger in a small external switch unit. A small movement of the finger toward the switch unit activates the switch. (Manufacturer – Luminaud, Inc. 216-255-9082)

Pillow Switch The Pillow Switch is a single switch operated by pressing the top foam surface. A pin and a velcro strip are attached to the bottom of the switch for fastening to a pillow or to clothing. (Manufacturer – TASH, Inc. 416-475-2212)

Pinch Switch The switch consists of a small, thin, wafer-like button. The user pinches lightly on the wafer and a switch is activated. Contact the manufacturer for additional information on this product. (Manufacturer – Kanor, Steven E. Ph.D., Inc. 914-478-0960)

Sip & Puff Switch This single switch is activated by either sipping or puffing into a tube. The tube is attached to a housing where the actual switch is located. Contact the manufacturer for additional information on this product. (Manufacturer – Kanor, Steven E. Ph. D., Inc. 914-478-0960)

DECtalk A voice synthesizer compatible with most computer systems. DECtalk offers six different voices (both male and female, child and adult). DECtalk converts text sent from the host computer to a pronunciation code using a combination of dictionaries and letter-to-sound rules. DECtalk then takes into consideration surrounding words and their effects on individual pronunciations. Rate of speech is up to 350 words per minute. DECtalk provides a user-specified dictionary for commonly used acronyms, trade terms, and special words. DECtalk may "speak" through its internal speaker, headphones, and external speaker or over the telephone. DECtalk accepts input from any computer. (Manufacturer – Digital Equipment Corporation 603-884-8991)

Echo + A speech synthesizer. The Echo + consists of an internal circuit card with a speaker. The Echo + has two voices: a natural sounding female voice with a limited vocabulary (700 words) and a robotic voice with an unlisted vocabulary (works by pronunciation rules). Simple commands are used to control the rate of speech (regular or fast), output mode (spoken, printed to the screen, or both), and how the test is read (letter by letter, word by word, or how much punctuation is spoken). Pitch and volume are also adjustable and a headphone jack is provided. Sound and music capabilities are also featured. The Echo + will work with Echo II software. (Manufacturer – Street Electronics Corporation 805-565-1612)

Light Talker An electronic communication aid with synthesized speech output and optional printer or keyboard. Selection can be direct, with an Optical Headpointer, or scanning with switches (all extra). Automatic scanning (single switch), row-and-column scanning (dual switch), and directed scanning (multiple switches), and Morse code input (two or three switches) are all possible. Minspeak allows vocabulary to be stored by things like abbreviation. Light Talker can also operate an environmental control system. (Manufacturer – Prentke Romich Company 216-262-1984)

Touch Talker by Prentke Romich Touch Talker is a portable electronic communication aid. Selections are made directly by pushing one of the keys on the keyboard. Messages can be displayed before being spoken. Vocabulary can be stored and recalled with level, abbreviation expansion, and number encoding techniques. The Touch Talker can also be used to operate an environmental control system.

COMPUTER DEFINITIONS

Input The information that goes into the computer or its peripherals (connecting hardware). Input peripherals include:

a. Keyboard
b. Disk drive or cassette recorder
c. Graphics tablet
d. Light pen

Software The program a computer needs to perform many of its operations. Software can be purchased in disk, cassette, or cartridge form, depending upon the computer. It can also be written using a programming language.

Central Processing Unit (CPU) The brain of the computer. The CPU is responsible for interpreting instruction, performing calculations, and outputting the information.

Microprocessor A chip of silicon (purified glass) which contains integrated circuitry. It is found in the CPU.

Memory The part of a computer that stores information. A computer contains two types of memory:

a. Random Access Memory (RAM)
The computer's main storage system. Program instructions and data are held here for instantaneous use by the central processing unit. This not permanent memory.

b. Read Only Memory (ROM)
Information permanently built into the computer. Stored on a memory chip, the ROM allows, for example, the CPU to understand BASIC programming language without using any other software.

Output Processed information, or the end product of a set of instructions. The data usually come out onto the display screen, or the printer can be used to transfer the electronic information to paper.

TYPES OF EDUCATIONAL SOFTWARE

Tutorial

a. The program assumes responsibility for instruction
b. Introduces subject matter, then tests student comprehension
c. Typically, a tutorial:
   (1) presents some subject material
   (2) puts it in context through examples
   (3) provides some drill and practice for reinforcement
d. Can keep complete records on each student being tutored
e. Can be tailored to accommodate range of individual differences

Drill and Practice

a. Assumes previous instruction in concept/skill to be covered
b. Used for reinforcement of related skills or concepts

Educational Game

a. Serves to motivate students to practice skills
b. Usually a form of drill and practice

Simulation

a. Enables students to explore, manipulate, and interact within an environment in which they will have to make decisions
b. Students are informed of their decisions, but don't suffer the consequences of poor judgement
c. Requires problem solving skills such as organization of information, working backwards, and making estimates
d. Emphasis is usually on the process of finding alternative solutions, not on right or wrong answers

Tool

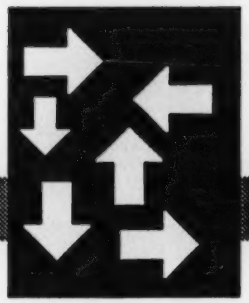
a. Offers a specific function (statistical analysis, calculation, word processing, musical notation, or graphic animation)
b. Saves time and intellectual energy by performing routine and tedious, but necessary, clerical tasks

Speech Synthesizers A speech synthesizer gives a computer the ability to talk. There are commercially available programs that utilize the speech synthesizer. There is also a program that works with the adaptive firmware card and Unicorn board allowing words to be "PROGRAMMED" into the computer. The majority of speech synthesizers available for people with special needs have a robotic sounding voice and can be difficult to understand. Some people catch on quickly to the voice, while others are confused by them. The Echo speech synthesizer can be obtained from Street Electronics Corporation, 1140 Carpinteria, CA 93013, (805) 684-4593.

ADDITIONAL ADAPTATIONS

External speaker The sound and music made by the computer are internal. For some children the sounds are not loud enough to hear. An external speaker with volume control can be attached to the computer to allow for the adjustment of sound levels and to allow the computer sounds to be turned off. This device has been useful with very young children and people with sensory and attention deficits. The speaker can be placed on top of the monitor to give people localized auditory feedback. The new Echo IIb speech synthesizer speaker can be used as an external speaker. If an Echo IIb is not available, a speaker jack and headphones can be purchased that can be used as an external speaker.

Available from Educational Software Review, Inc., 1400 Shattuck Avenue, Suite 774, Berkeley, CA 94709



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Videotape:

TITLE: A NEW WAY OF THINKING

PRODUCER: Minnesota Governor's Planning Council on Developmental Disabilities & Minnesota UAP on Developmental Disabilities (1988)
300 Centennial Office Building
658 Cedar Street
St. Paul, MN 55155
(612) 296-4018

TITLE: AN ELEPHANT AT MOUSE PLACE

PRODUCER: Kittelson & Leadholm
Minnesota Governor's Planning Council
on Developmental Disabilities (1990)
300 Centennial Office Building
658 Cedar Street
St. Paul, MN 55155
(612) 296-4018

TITLE: EATING COMES NATURALLY (One or three parts)

PRODUCER: Physical Therapy Division
Sparks Center
University of Alabama at Birmingham
Box 313 UAB Station, Birmingham, AL 35294
(205) 934-5457

TITLE : REGULAR LIVES

PRODUCERS: Tom Doodwin & Geraldine Wurzburg
(1988) Syracuse University
WETA Educational Activities
P.O. Box 2626
Washington, D.C. 20013

TITLE: RICHARD DODDS ON TECHNOLOGY

PRODUCER: Kittelson & Leadholm
Minnesota Governor's Planning Council
on Developmental Disabilities (1990)
300 Centennial Office Building
658 Cedar Street
St. Paul, MN 55155
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TITLE: TECHNOLOGY: TOOLS FOR LIFE

PRODUCER: Kittelson & Leadholm
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